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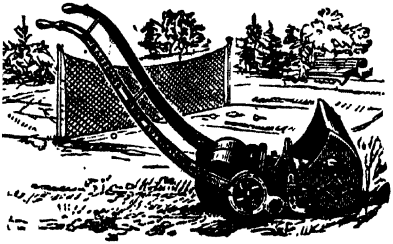

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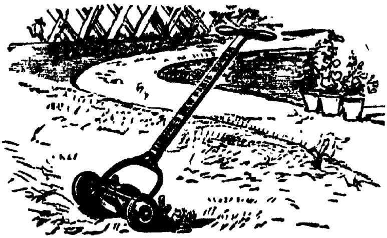

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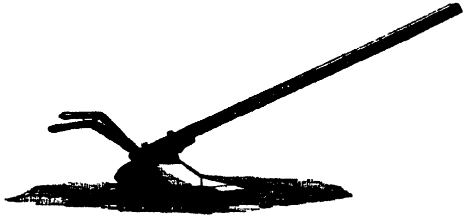

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NOTES ON THE FRONTISPIECE.

A Design for a Compound of 10 Acres.

Although this design is stated to be for 10 acres, there is no reason why its best features may not be attained on less than half that area, and it may suggest arrangements adapted for a space five times as great.

The principal idea is to obtain as great a length of road with as varied a scenery as is practicable within the limits. Assuming that we enter from (28), the public road, by (27), the gate-house, we find a broad, straight road bearing full upon (21), an architechtural ornament, the Conservatory. On the way we pass on the left (26), a pond, in which the *Victoria regia*, *Nelumbium speciosum*, *Kummul*, and other water lilies are growing and water-fowl disporting; it is formed by widening and deepening a rivulet or irrigation canal.

Taking the first turning to the right, we approach the boundary line which the road follows, a part being through (22), an arcade of trellis work 25 feet wide and of the same height, on which the grape vine and a few very choice flowering climbers luxuriate. Passing (13), a group of orange or pomegranate trees, we find a culvert through which a stream flows, and a few yards further (11), the hydraulic ram, a simple and durable machine for pumping water, which goes on day and night without attention, driving water up to a tank on the top of (20), the mansion, whence a full supply of water for domestic purposes and a safeguard against fire are obtained; the force that works the hydraulic ram is obtained by obstructing the stream near the point where it is crossed by the road at the corner.

The overflow is permitted to trickle over (10) the rocky bottom and produce that delightful sound of a falling streamlet; a charming natural melody of priceless value to the hard-worked brain We pass (9), the lawn-tennis court, which communicates with (21) the Conservatory, by paths covered in with lattice work bearing choice climbers and affording the shaded paths so necessary to some ardent thinkers whose best work is produced, while combining quiet physical with mental labour, and (8) a vinery having the plants trained on the system found most profitable in Britain, where the vines are trained up the rafters of a house covered with glass. In the country the glass is not required, but the system of training has been employed with great success. The place is an excellent shade for children during sunny hours, and the spectators often enjoy shelter that tennis players must dispense with. By (7), a small water tank, passing (14), a group of mango or peach trees, and (15), an arbour or temple, we may reach the back entrance to (20), the mansion; or retaining the wide road, we pass (6), the vegetable garden, (3) the mallee's house, (2) a tool-house, and (1), a cowshed, (5), the dairy, and (4), the stables and grooms' quarters, (16) the quarters of the house servants, (17), the kitchen communicating with the house by (18), a passage covered with trellis work bearing Marechal Niel roses and the fragrant edible fruited Passion flower we reach (19), a small rock-work garden; (23) and (24), the flower gardens, (25), a paddock, in which foals disport or sleek kine browse the dewy herb. The use of (29) and (30) is obvious if the views beyond are uninteresting.

PREFACE TO THE FOURTH EDITION.

THESE "HINTS" were written for the use of the soldiers of the British Army in India, to whom a beneficent Government not only offers the use of land, but yearly presents a supply of flower and vegetable seeds and prizes for their successful treatment, with a view to providing for the men a pleasant and useful employment for their leisure hours. The wisdom of this act of grace cannot be doubted, as it not only furnishes healthful recreation and tends to relieve the monotony of the soldier's life in India, but the taste for gardening that is encouraged may supply the retired soldier with the means of earning a respectable living and thereby improve the status of the rank and file. The author is satisfied that there are many others by whom such a book is required, as, besides Firminger's expensive work, there is little else on the subject in print. Amateur cultivators are very numerous in India, and their number would be greatly increased if disappointment and ill-success through want of a simple guide did not cause many to keep their natural taste in abeyance. If these "HINTS" tend in the slightest degree to "form a serene parenthesis from care" they will not have been written in vain.

The rapid sale of the previous editions of this work shows at least that the subject is interesting. This edition has been greatly increased in size with the results of extended experience, and tables showing the mean temperature, the rainfall, and the maximum and minimum temperature at many of the principal stations in India have been included.

Numerous illustrations taken from photographs have been introduced, for a few of those I am indebted to the "Gardeners' Chronicle," a journal that for many years has maintained the leading place in horticultural literature, a few are copied from "Nicholson's Dictionary of Gardening," and the frontispiece is an example of the lithographic work of the Poona *Chitra Shala*

The meteorological tables have been compiled from the reports on the weather submitted to the Government of India with the kind permission of the Meteorological Reporter, and may be a great assistance to the intelligent reader in understanding the probabilities of success in growing any particular horticultural product at a station in which, as far as is known, success has not previously been attained. For instance, the "Cintra" orange thrives at Nagpore, where the average rainfall is—

January, 0·61, February, 0·42, March, 0·63, April, 0·45; May, 0·83; June, 8·99, July, 12 94, August, 8·82, September, 7·92, October, 2·15, November, 0·41, December, 0 34.—Total, 44·51 inches.

The mean temperature at Nagpore is in Fahrenheit degrees—

January, 68·6, February, 73 8, March, 81·9; April, 88·8, May, 93 1, June, 85·7, July, 79·1; August, 99·3, September, 79·1 ; October, 77·2 ; November, 70·7 ; December, 67·1.—Yearly average, 78·7.

The maximum and minimum temperature at Nagpore is in Fahrenheit degrees—

JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
89°	48°	97°	50°	105°	59°	101°	67°
MAY		JUNE.		JULY.		AUGUST.	
Max	Min	Max.	Min.	Max.	Min.	Max.	Min.
116°	72°	108°	71°	94°	71°	49°	72°
SEPTEMBER		OCTOBER		NOVEMBER.		DECEMBER.	
Max	Min	Max.	Min.	Max.	Min	Max.	Min.
92°	70°	93°	59°	88°	50°	83°	48°
			YEARLY	MEAN			
			Max.	Min.			
			116°	47°			

May the Cintra orange, which thrives under the above climatic conditions, be expected to thrive at Bombay (Byculla), where the rainfall is—

January, 0·16 ; February,   ; March, 0·02 ; April,   ; May, 0·44 ; June, 21·91 ; July, 27·18 ; August, 17·35 ; September, 12·43 ; October, 2·63 ; November, 0·04 ; December, —Yearly mean, 82·16, inches.

The mean temperature at Bombay (Byculla) is in Fahrenheit degrees—

January, 73·9 ; February, 74·5 ; March, 79·0 ; April, 82·5 ; May, 85·0 , June, 83·1 ; July, 80·9 ; August, 80·1 ; September, 80·0 ; October, 81 ; November, 78·9 ; December, 76·8. —Yearly mean, 79·7.

And the mean maximum and minimum temperature at Bombay (Byculla) is in Fahrenheit degrees—

January.		February.		March.		April.	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
89°	63°	88°	63°	91°	68°	92°	74°
May.		**June.**		**July.**		**August.**	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
92°	77°	92°	74°	87°	74°	86°	74°
September.		**October.**		**November.**		**December.**	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
91°	72°	90°	66°	89°	66°	93°	63°

Yearly Average.	
Max.	Min.
93	63

On comparing the climate of these two stations it will be seen that the probabilities are against the success of orange growing at Bombay, because the climate is more moist and equable than that of Nagpore and the alternations of growth and rest which the orange tree requires would be wanting, and remedial measures will in some cases readily be suggested.

The gentlemen who have assisted me with notes from provinces I have not given sufficient time to study personally are all men of wide experience and specially trained for observation in horticulture, therefore their work may be relied on as trustworthy.

The work of correcting for the press has often been done during late evening hours, after a busy day of official duties, and at a distance from the press, hence the well-informed critic may observe numerous slips in the arrangement of the matter and in the English which I hope to eliminate if called on for another edition.

G. MARSHALL WOODROW.

Poona, August 1888.

PLAN FOR A VILLA GARDEN.

IN selecting a plan for the above, I have endeavoured to choose one which has an outline of ground often met with on estates which are laid out for building purposes, and which comprise plots from 2 to 3 acres in extent with only one frontage facing the high-road, the other sides being surrounded by similar sized residences and gardens.

In describing the annexed design, it may be stated that the original surface slopes gradually from the north and north-west, the only view obtainable being from the south, consisting of grass fields and wooded hills in the distance, which will be easily seen from the house (1), built on an elevated position, and surrounded by a broad terrace, as well as from most parts of the grounds, by planting judiciously that part of the shrubbery which screens the lawn (3) from the high-road for about 30 yards with dwarf-growing shrubs which will not obstruct the landscape.

The positions of the house and stables (12) are fixed in the most convenient situations, and the kitchen garden (8) adjoining is walled in with trained fruit trees, and there is easy access to it from the pleasure grounds and back of house, and also from the stable-yard to enable manure, &c., to be wheeled into it without coming through the private grounds; it is also of good size, to allow everything to be grown except potatoes, the ground being too valuable for space to be set apart for these.

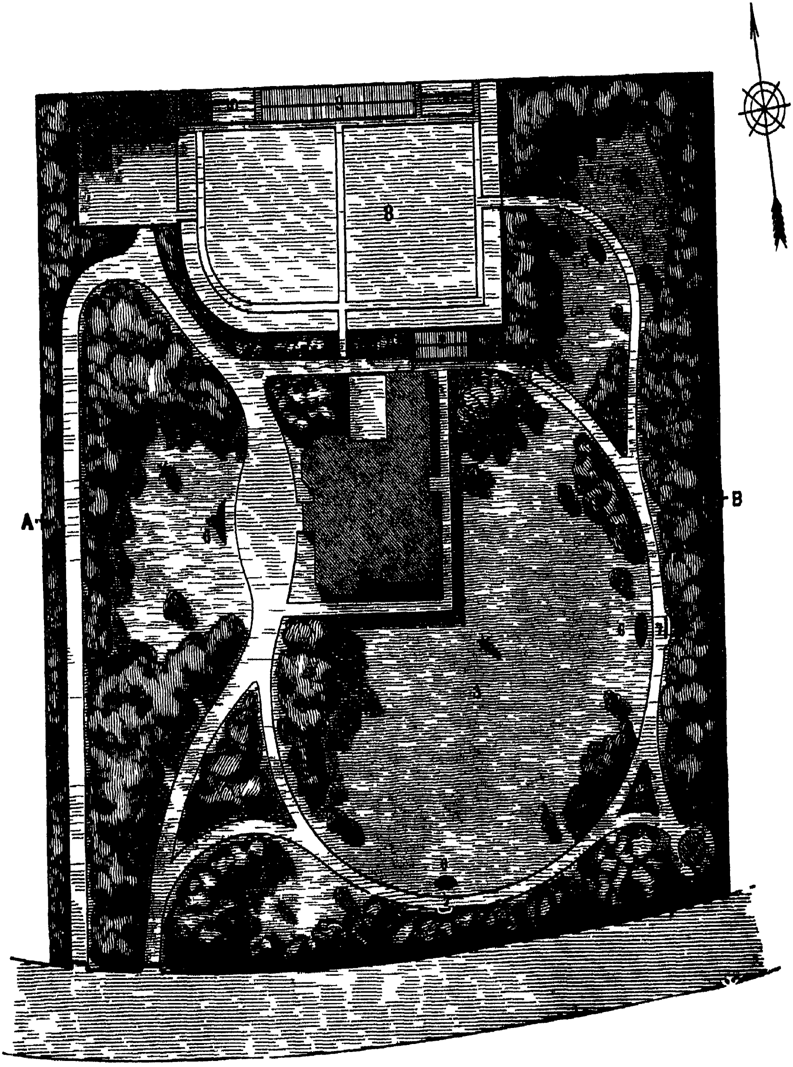
The site for a range of two vineries and one plant-house (9), with two frames (10) on each side, is shown against the north wall, potting shed (11) being built against the stables. The conservatory (2) is also provided for, and is placed conveniently to the house.

A bold carriage-drive is made from the high-road to the house and round to the stables, well planted in, and screened from the private grounds, and a road is made for the use of tradesmen going to the stables and back offices.

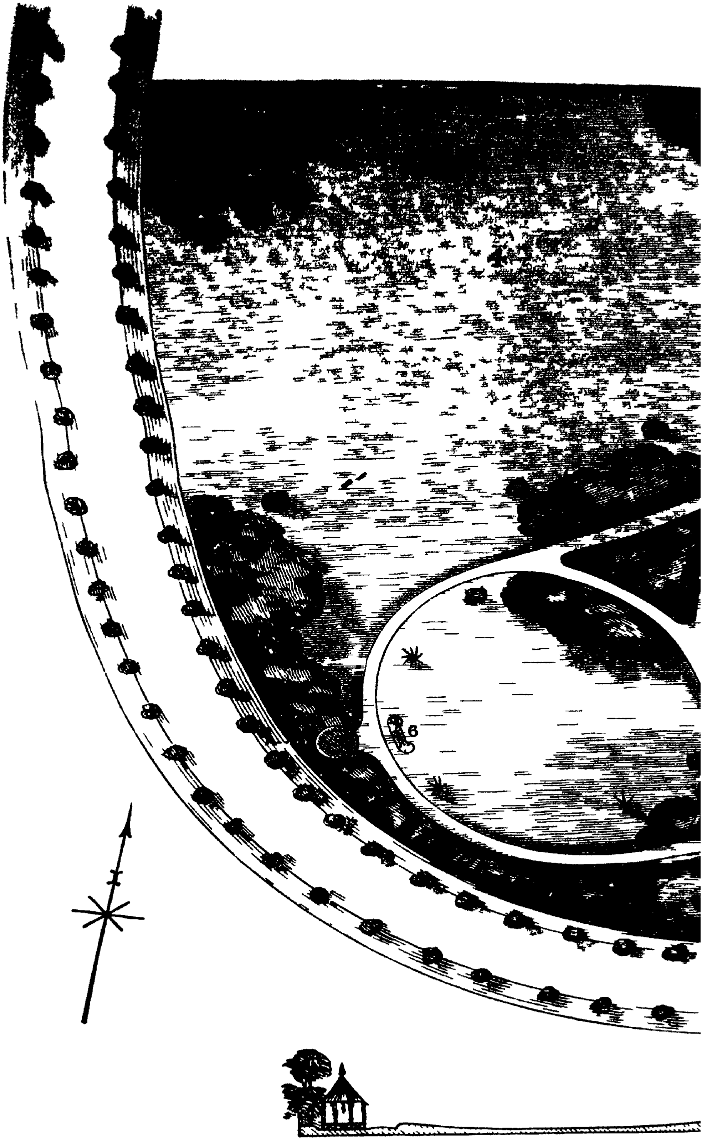
The lawn (3) is of ample size and is provided with two large tennis-courts. Flower beds (6) and seats (7) are distributed over the grounds and to brighten up the vistas and shrubberies.

A summer-house (4) is constructed with walks leading to it and two beds of rhododendrons (5) in front, which give a very agreeable effect and insure the space being kept open for view to the lawn.

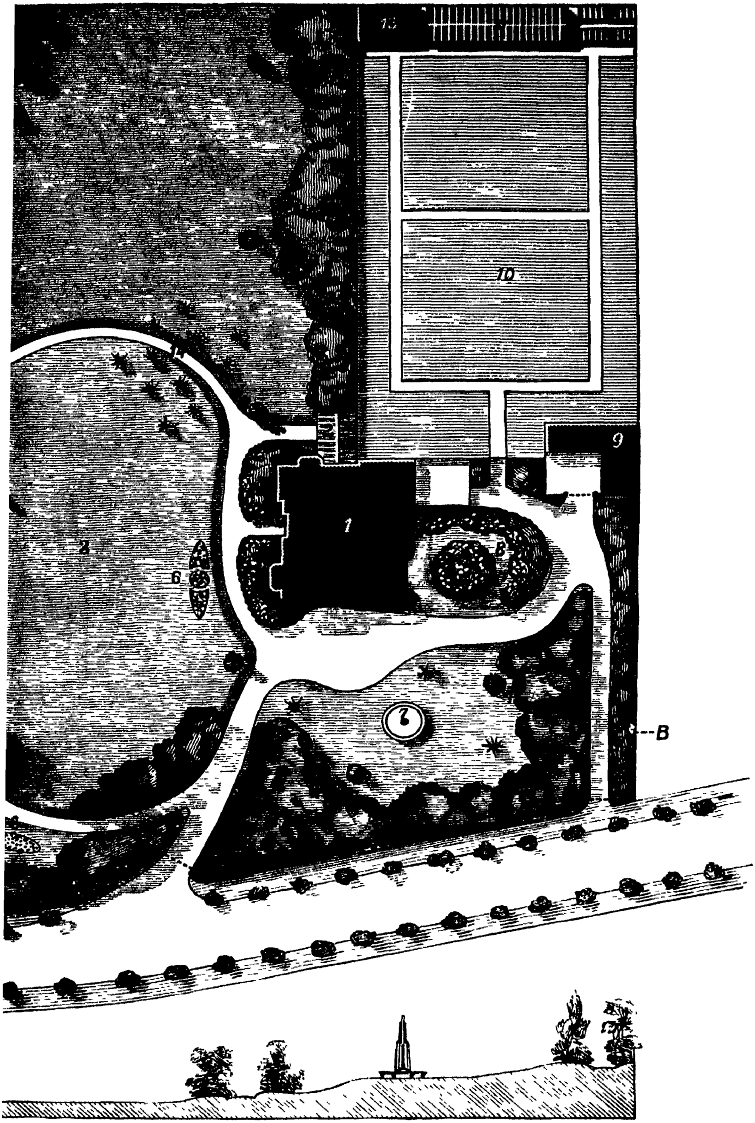
The shrubberies are planted so as to shut out all buildings on either side and make the grounds private. Several specimen palms as well as evergreen and deciduous trees and shrubs are planted on the grass, so as to give it an ornamental appearance.—*A. G. Jackman, Landscape Gardener, Woking.*



PLAN OF A VILLA GARDEN



PLAN OF A VILLA



.ND SECTION OF THE GROUND.

PLAN OF A VILLA GARDEN AND SECTION OF THE GROUND.

REGARDING this plan Mr. Jackman writes in the "Gardener's Chronicle":—

"The few observations I shall make on the principles of landscape gardening will be confined to one or two leading points. The plot of ground dealt with is but a small one, and does not admit of a great deal of detail, or the carrying out of any complex idea, as will be observed by a glance at the plan page. The first thing to notice is the shape of the ground, its advantages and disadvantages with regard to its surroundings, levels, aspect, &c.; then, having fixed the sites for the house and offices that are the most convenient for utility and comfort, the next, or second step, is to take note of the surrounding country, and attempt to bring in whatever distant views the limited space will allow, and which should always be considered in choosing the site for a house, although it should not be treated as of the first consequence, for in *India exposure to health-giving breezes* is of infinitely more importance.

"Repton wrote in regard to the prospect from the windows of a house, that 'we have no choice of moving the point of view; it is fixed, and must be stationary; it is therefore necessary to study this with full attention, and to ascertain what are the objects most desirable to form this permanent scenery, and how other objects may be introduced to vary and enliven the landscape always seen from the same spot."

"By showing lines of sight on this plan [unfortunately omitted in the engraving] I have endeavoured to point out how, by judicious planting, distant views may be taken in, and in no way allowed to interfere with the harmony of the design. I will now explain the details of the plan.

"The design I have chosen is a corner plot of ground abutting on the high road, which is planted with an avenue of *wad*, *Ficus Indica*, and surrounding it on two sides. The house (1) stands in a prominent position, with the ground sloping gradually from it on all sides except the north-east and has a large conservatory (2) attached to it.

"The lawn (3) in front of the house has been levelled and prepared as a lawn-tennis ground, and the walk, which runs round it, is slightly lowered, thereby giving the two grassed areas the appearance of being both in one piece when viewed from the house or at a distance.

"The summer-house (5) is conveniently situated, commanding good views over the lawn and paddock, besides being an agreeable object as seen from the house. Several flower-beds are placed in advantageous positions, so as to vary and enliven the different parts of the grounds. The paddock (4) is divided from the pleasure-grounds by an invisible iron fence, which does not obstruct or mar the beautiful views of the hills and other pleasing objects in the distance.

"A group of wild date trees (14) has been placed sufficiently wide apart at the top end of the lawn-tennis ground to allow the distant views to be seen, which would have been obstructed if a shrubbery had been substituted. The whole of the grounds is enclosed by an ornamental iron fence and a *Duranta* hedge. The approach is formed as a continuation of the high road, which gives it a fine appearance.

"A convenient road is also made to the stables (9), house, offices, and kitchen garden (10), the whole being well screened by planting from the more private grounds. Several ornamental flower-beds planted as carpet patterns are shown (6). The fountain (7), which should always be an object of beauty in a garden, is effective on this side of the house. The beds, situated in recess (8), are planted with rose trees, *Hibiscus*, *Yucca, Eranthemum*, and *Croton*, with a margin of *Pancratium littorale* sloping down to *Zephyranthes* and add pleasant features to the garden in this part. The kitchen garden (10) is of good size, with greenhouse and vinery (11), frames (12), and potting-shed (13). The letters A, B on plan show the line of section."—*A. G. Jackman, Landscape Gardener, Woking.*

The trees named by Mr. Jackman have been altered to suit the climate of India.

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ERRORS AND EXOEPTIONS.

Page 23	line 5 from bottom	For	*humours*	read	*humus.*
29	„ 2 „ „	„	*carbolic acid*	„	*carbonic acid.*
28	„ 12 „ „	„	*luxurious*	„	*luxuriant.*
38	„ 12 „ „	after	*throughout*	insert	*the country*
40	„ 9 „ top	for	*evaporarion*	read	*evaporation.*
42	„ 4 „ bottom	after	*fro*	insert	*by.*
48	bottom line	for	*dentification*	read	*identification.*
83	„ 2 from bottom	„	*Bombax*	„	*Bombyx.*
8	„ 2 „ top	„	*during season*	„	*during the cold season*
100	bottom line	„	*flower*	„	*flour.*
109	„ „	„	*plaint*	„	*plant.*
110	line 14 from top	„	*productions*	„	*production.*
129	„ 7 „ bottom	„	*was*	„	*were.*
151	„ 4 „ „	„	*Lychmos*	„	*Lychnos.*
193	„ 14 „ top	„	*attain*	„	*attains.*
224	top line	„	*enarch*	„	*inarch.*
233	bottom line	„	*Leguminosa*	„	*Leguminosæ*
239	top line	„	*Canavallia*	„	*Canavalia.*
288	line 17 from top	„	*Combretium*	„	*Combretum.*
291	„ 15 „ „	„	*sub or bicular*	„	*sub-orbiculor.*
316	„ 13 „ „	„	*Periska*	„	*Pereskia.*
324	„ 11 „ „	„	3 *to* 1,000 *feet*	„	3,000 *to* 4,000 *feet.*
329	„ 5 „ „	„	*Rondoletia*	„	*Rondeletia.*
329	„ 4 „ bottom	„	*Rondoletia*	„	*Rondeletia.*
351	„ 11 „ top	„	*son*	„	*sone.*
459	„ 10 „ „	„	*Pancretium*	„	*Pancratium.*
531	„ 6 „ „	„	*Enarch*	„	*Inarch.*
577	bottom line	„	*shrubberries*	„	*shrubberies*
600	„ 3 from bottom	„	*Thimbergia*	„	*Thunbergia.*

HINTS ON GARDENING.

SOIL.

A GOOD soil for a garden should present the following characteristics. It should be at least two feet deep, small stones to the extent of not less than 10 per cent. or more than 20 per cent. should occur, mixed with the fine portion of the soil.

The particles composing the fine portion of the soil should be in such a minute state of division that when moistened and pressed in the hand, the points of the fingers of a delicate hand should not feel gritty matter. Such a soil is called loam. In an air dry state it may consist of—

Small stones	15 per cent. nearly.
Fine sand	50 ” ”
Clay and oxide of iron	10 ” ”
Limestone	5 ” ”
Organic matter and water...	15 ” ”
Potash	Each in proportion near to ½ per cent. and traces of a few unimportant bodies.
Soda	
Magnesia	
Chlorine	
Carbonic acid	
Sulphuric „	
Phosphoric „	
Nitric „	

CHARACTERISTICS OF GOOD SOIL.

Such a soil retains water a moderate time : it absorbs moisture from damp air; it retains the volatile or soluble parts of manure ; it permits the passage of air and water sufficiently; it is easy to work, and consequently, when in a favourable climate, it is fertile.

The colour of the upper layers of a soil is not of much consequence, although in temperate climates a dark colour will probably indicate much vegetable matter; in the plains of India the black soil does not contain more vegetable matter than soils of other colours. The layers of soil more than 9 inches from the surface or sub-soil sometimes exhibit a bluish or yellowish colour from the presence of iron oxide, which has not been exposed freely to air (ferrous oxide). A soil in which this sign is found will require much extra digging and exposure to air before it is fit for garden plants. When the blue or yellow tint has changed to the colour of iron rust by the action of the air, its condition will be improved.

Deep cracks during dry weather indicate either excessive minuteness of the particles of the soil and consequent power to absorb water or bad drainage. Soil which cracks deeply, although it is fairly well drained, generally is good soil ; but it is " stiff " or difficult to dig or plough. A soil which is badly drained is unfit for a garden until the drainage is improved.

If a soil shows abundant fine roots of grass it is a good sign ; but in the plains of India a first-class soil may not have this mark, because the heat and moisture causes grass roots to decay so quickly after the plant has died that the fibrous loam ,which is the English gardener's mainstay, is rarely to met with.

If the soil shows good healthy growth of any of the common crops of the country, it can easily be made a garden soil.

If the plants produced by the soil naturally have widely-spreading foliage, the soil must be rich or the atmosphere moist. If the natural herbage is stunted and thorny a dry climate or a poor soil is indicated. The effects of browsing goats and cattle in inducing short stunted growth being considered.

VALUE OF SIGNS GIVEN BY NATURAL HERBAGE.

If the blue Pimpernel, *Anagallis arvensis*, or members of the Gentian family, pretty little rose or blue starlike flowers on herbaceous plants with stalkless leaves and square stems, appear during the cold season the soil is probably poor and needs draining.

Where the pretty little blue flower called *Vishnoo-krant* (*Ipomœa alsinoides*) occurs it indicates a dry sandy soil, sometimes with excess of salt.

Signs which indicate the character of the soil by the particular kinds of plants growing upon are of great value locally, and a long list of such signs might be given ; but the advantage to the beginner in cultivation would be little because those obscure plants which have no known medicinal or other properties that are appreciated by people generally, have not well-known vernacular names. The few instances given here are intended to draw the attention of the inexperienced cultivator to such matters and thereby induce the desired knowledge which it is impracticable to convey otherwise.

If a soil is very sandy, clay dug from the bottom of a tank and spread on the surface to the thickness of one inch will make the soil sufficiently tenacious ; but if the soil is stiff clay, to alter its condition will require such a large quantity of sand that, except on a small scale, the operation would be impracticable.

SOILS CONTAINING EXCESS OF SALT.

Some soils bear a white efflorescence during the cold season. If this sign is coupled with a barren appearance, the soil probably has excess of carbonate of soda mixed with common salt, and generally will be an impracticable soil for a garden. If the soil shows a white efflorescence with crops growing freely, the salt is probably saltpetre, produced by liberal manuring with wood-ashes and strong nitrogenous manures in the presence of lime. The presence of the salt on the surface indicates that the water is coming upwards, and as fertility is increased by water passing downwards and carrying air with it, the salty surface will be improved by deep draining.

The Deccan is traversed by ranges of hills formed of trap rock, of which the upper portion, called *moorum,* is generally soft and easy to break down while moist. If walls are built on the slopes so as to prevent the heavy rains from washing away the soil and irrigation provided, this kind of soil becomes remarkably fertile, it is easy to work, and does not become water-logged. Such soil is the favourite of the market gardeners of Poona—men who know the capabilities of a soil as well as any one.

POSITION OF THE GARDEN.

N the situation of the garden it is of great importance to have protection from the prevailing winds. If natural shelter is not available, the first attention must be given to providing a screen of some kind. For this purpose, such trees as are found to grow luxuriantly in the neighbourhood may be planted, or if the garden be small and immediate effect desirable, coir matting may be stretched between poles set up at intervals. On the sheltered side of the matting a hardy climber may be planted to improve the appearance of the screen; but the protecting screen must not be too dense or near. What is wanted is that the air currents may be broken rather than stopped, because a garden where a close, still atmosphere prevails, will have much fewer flowers than one open to the breeze, which cools the air and causes the dew to fall. The close moist atmosphere, which is laconically termed muggy, is adapted for many kinds of foliage plants and an open airy position for flowering plants. Which of the two is the more agreeable in this climate I need scarcely indicate.

ASPECT.

Regarding aspect, a point between east and north is desirable. The east wind is often severe on garden plants; but the amount of its mischief will be found less than the intensified sun's rays on the other exposures produce. Moreover, when plants are moist with dew or fresh from the cool night, the rays of the rising sun appear to have an invigorating effect that is decidedly wanting when the plants have been subject to heat sufficient to evaporate the greater part of the moisture gathered during the night before they are struck by the powerful rays of the midday sun. But very often the site of the garden has to be a subordinate consideration, because it often occurs that the finest garden soil is an expensive or inconvenient site for a house, and specially in the case of barracks, which are generally built on a high situation so as to secure a perfect supply of pure air and thorough drainage. In such situations the soil that nature is constantly forming by the crumbling of rocks is periodically washed down to lower levels, and of course is not to be found of any great depth ; but if the rock is of such a nature that it will yield to well-directed blows of a pick, it may be turned into a fertile soil by breaking it up and mixing with all kinds of vegetable refuse. Weeds buried in a fresh state and the dung of bullocks and buffaloes are excellent manures for a soil of this nature, and it often yields flowers in greater abundance and with more brilliant colours than a rich soil would produce. Heating manures, such as night-soil, horse or sheep dung, should be avoided when the soil is shallow and stony, as it must be in such a position.

CLIMATE.

The importance of a special study of climate in its relation to horticulture at any particular part of India needs few arguments to place the matter sufficiently before the intelligent reader. "Mud (clay) and sand are pretty much the same every where," and the possibilities of the garden at one station as compared with another are very nearly in proportion to their similarity in climate. A set of tables showing the principal conditions included in the term climate follows, those tables are compiled with permission from the meteorological reports of the Government of India. When referring to the cultivation of particular garden products the climate of the station at which special success is met with may be noted and compared with the conditions obtaining at the place where the necessary cultivation is wished. By intelligent study of those tables difficulties may be explained and arrangements to aid nature by shelter, exposure, or irrigation will readily be suggested.

TABLE showing the average monthly and annual rainfall of some important Stations in India.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.	Average yearly rainfall.
Agra	0·55	0·30	0·23	0·16	0·70	2·75	9·69	6·33	4·35	0·33	0·03	0·24	25·66
Ahmedabad	0·01	0·09	0·02	0·04	0·71	3·34	11·06	9·00	4·42	0·65	0·03	0·05	29·42
Ahmednagar	0·41	0·08	0·19	0·48	1·37	5·02	3·11	4·13	6·94	2·94	0·90	0·13	25·70
Ajmere	0·20	0·34	0·43	0·11	0·71	2·29	7·08	7·37	3·34	0·26	0·13	0·29	22·55
Akola	0·53	0·16	0·46	0·11	0·21	5·22	7·10	6·75	5·70	1·99	0·45	0·31	28·99
Aligarh	0·74	0·50	0·43	0·21	0·47	3·12	9·16	6·66	3·97	0·48	0·02	0·30	26·06
Allahabad	0·78	0·44	0·44	0·15	0·33	4·46	12.09	9·61	6·84	2·19	0·24	0·11	37·68
Amraoti	0·51	0·21	0·34	0·23	0·65	6·87	8·76	7·34	5·23	1·50	0·21	0·24	32·09
Amritsar..........................	1·07	1·20	0·83	0·68	0·86	2·26	8·54	6·73	2·88	0·50	0·27	0·70	26·52
Arcot...	0·48	0·64	0·45	0·57	2·58	2·36	3·42	6·11	5·32	5·39	5·87	1·69	34·88
Aurungabad	0·10	0·03	0·02	0·05	0·90	6·82	6·55	6·80	7·32	2·48	0·60	0·22	31·89

TABLE showing the average monthly and annual rainfall of some important Stations in India—*continued.*

ION		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average yearly rainfall.
Bangalore		0·22	0·15	0·59	1·34	4·95	3 20	4·03	6·09	6·34	6·31	1·80	0·65	35·67
Belgaum		0·07	0·02	0·50	2·04	2·83	9·60	15·05	8·97	3·66	4·60	1·24	0·29	48·87
Bellary		0·10	0·04	0·60	0·82	1·86	1·71	1·38	2·34	3·76	3·76	1·01	0·26	17·64
Benares		0·74	0·53	0·35	0·17	0·52	4·77	12·99	10·90	6·38	2·00	0·15	0·06	39·56
Bijapur		0·04	0·03	0·21	0·53	0·71	3·60	2·51	4·24	6·09	4·25	1·23	0·77	24·21
Bolarum		0·14	0·24	0·50	0·54	1·14	3·58	5·80	6·70	5·77	3·17	0·46	0·40	28·44
Bombay.	Colaba	0·12	0·02	...	0·03	0·56	20·80	24·52	14·99	10·74	1·78	0.48	0·04	74·08
	Byculla	0·16	0·00	0·02	...	0·44	21·91	27·18	17·35	12·43	2 63	0·04	...	82·16
Burdwan		0·30	0·84	1·27	2·59	4·99	10·04	12·42	12·33	7·90	4·92	0·58	0·17	58·35
Calcutta (Chowringhee)		0·44	0·97	1·31	2·37	5·48	11·77	12·96	13·94	9·92	5·42	0·60	0·32	65·50
Cawnpo		0·73	0·46	0·25	0·14	0·43	3·35	9·67	8·06	4·86	1·01	0·07	0·16	29·19

Coimbatore	0·27	0·14	0·61	1·94	2·58	1·79	1·35	1·23	1·23	5·90	3·33	0·97	21·34
Colombo	3·39	1·94	5·71	9 46	13·09	7·52	5·63	4·99	4·72	12·36	12·82	6·11	87·74
Cuttack	0·40	0·47	0·93	1·44	3·09	10·30	12 77	11·41	9·71	5·79	1·03	0·48	57·82
Dacca	0·29	0·97	2·45	5 84	9 25	13·25	12·93	12·38	10·19	5·40	0 68	0·23	73 86
Darjeeling	0·74	1·11	2·35	3·72	7·10	25·25	29 86	26 19	17·66	6·50	0·21	0·16	120·85
Delhi	0·81	0·55	0·79	0·39	0·67	3·03	8·64	6·69	4·40	0·52	0·08	0·35	26·92
Dharwar	0·15	0·02	0·32	1·36	2·89	5·45	6·30	5·13	3·32	5 80	2.24	0·40	33·39
Dhulia	0·37	0 07	...	0·02	0·37	4·76	4·59	4·08	4·35	1·66	0·55	0·15	20·97
Durbhunga....................	0·47	0·57	0·28	0·61	2·23	8·20	11·90	11·32	8·92	2·70	0·08	0 11	47·39
Hyderabad (Deccan)	0·15	0·08	0·34	0·68	0·80	4·41	5·42	6·17	7·20	3·37	0 93	0·67	30·22
Hyderabad (Sindh)	0·21	0·15	0 09	0·24	0·04	0·44	2·94	3 27	0·75	0·01	0·06	0·01	8·21
Indore	0·34	0·29	0·02	0·13	0·42	6·52	10·59	8·06	8·68	0·92	0·17	0·14	36·28
Jacobabad	0·23	0·23	0·33	0·16	0·11	0·09	1·32	1·39	0·26	0·01	0·09	0·11	4·33
Jeypore	0·24	0·19	0·20	0·24	0·72	3·50	9·43	5·66	2·74	0·22	0·09	0·45	23·68
Jubbulpore	0·58	0·46	0·50	0·24	0·39	8·17	18·15	13·67	8·38	1·42	0·34	0·16	52·46
Khundwa	0·28	0·33	0·09	0·08	0·32	6·45	10·33	7·51	6·54	1·04	0·10	0·22	33·29
Kolhapur	0·03	0·02	0·08	1·39	2·07	7·56	11·49	7·17	4·07	4·92	0 67	0·12	39·59

TABLE showing the average monthly and annual rainfall of some important Stations in India—*continued.*

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average yearly rainfall.
Kurrachee	0·60	0·26	0·15	0·18	0·05	0·19	2·97	1·87	0·86	0·07	0·07	0·20	7·47
Lahore	0·62	1·16	1·08	0·59	0·87	1·71	7·25	4·68	2·49	0·54	0·16	0·49	21·64
Lanauli	0·06	0·02	0·15	0·02	0·51	29·68	64·16	41·47	24·33	4·43	0·24	0·06	165·13
Lucknow	0·92	0·29	0·30	0·14	0·80	4·30	10·99	10·21	7·00	1·29	0·01	0·34	36·59
Madras	0·95	0·30	0·42	0·65	2·24	2·02	3·82	4·51	4·74	10·80	13·40	5·04	48·89
Madura	0·80	0·45	0·65	2·25	2·72	1·52	1·59	4·67	4·39	8·88	5·37	2·04	35·3
Mahableshwar	0·40	0·05	0·39	0·88	1·28	47·85	99·75	68·24	33·11	5·25	1·03	0·26	258·49
Mangalore	0·18	0·09	0·13	2·19	8·56	38·64	37·86	23·36	11·43	8·01	1·86	0·56	132·8
Meerut	0·88	0·79	0·74	0·43	0·77	3·54	9·45	6·62	3·82	0·42	0·05	0·34	27·8
Mooltan	0·32	0·30	0·48	0·37	0·46	0·33	2·27	1·23	0·87	0·12	0·05	0·27	7·0
Mount Abu	0·22	0·40	0·15	0·05	1·08	5·04	22·02	22·86	8·63	2·31	0·20	0·25	63·2

Mysore	0 09	0·14	0 71	2·23	5·65	1·82	2·34	3·24	3·89	6·32	1·65	0·46	28·54
Nagpur	0·61	0.42	0·63	0·45	0·83	8·99	12·94	8·82	7·92	2·15	0·41	0·34	44·51
Naini Tal	2·99	2·95	2·51	1·65	2·89	15·34	24·99	23·98	10·78	1·60	0·20	1·29	91·17
Nasik	0·07	0·04	0·02	0·08	0·61	6·13	7·26	5·13	5·19	3·64	0·53	0·21	28·91
Negapatam	1·18	0.82	0·13	1·08	1·79	1·18	1·27	3·33	3·84	7·96	13·85	9 84	46·27
Nusseerabad	0·10	0.51	0·12	0·04	0·70	1·63	7·16	6·16	3·29	0·28	0·13	0·27	20·39
Ootacamund	...	...	...	...	...	...	...	...	...	...	...	...	...
Patna	0·70	0·52	0·35	0·31	1·60	7·24	10·74	9·87	7·79	2·82	0·22	0·13	42·29
Poona	0·24	0·04	0·18	0·56	1·64	5·87	6·59	4·21	4·24	3·87	0·75	0·19	28·38
Quetta	0·94	1·67	1·90	0 94	0·31	0.17	1·00	0·57	0·21	...	...	0·53	8·24
Ratnagiri	1·11	0·02	...	0·17	1·49	31·85	33·17	19·60	12 93	3·33	0·83	0·05	104·55
Rawalpindi	2·16	2·00	1·73	2·37	1·38	1·71	7·63	6·90	3·31	0·53	0·95	1·12	31·79
Roorkee	2·00	1·56	1·07	0·37	1·18	4·99	12·66	11·56	5·00	0·63	0·20	0·35	41·57
Saharanpur	1·42	1·46	1·18	0·41	0·78	4·40	12·39	9·29	3·92	0·44	0·19	0·48	36·36
Salem	0·37	0·08	0·92	2·13	4·53	3·13	3·94	5·78	6·08	7·22	2·65	0·70	37·53
Satara	0·34	0·08	0·08	0·90	1·37	7·85	13·00	7·34	4·53	3·39	1·62	0·39	40·89
Shevaroy Hills	0·42	0·19	0·77	2·61	6·33	4·75	7·70	10·08	8·50	10·41	6·03	2·81	60·60

TABLE showing the average monthly and annual rainfall of some important Stations in India—*continued.*

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average yearly rainfall.
Sholapur........................	0·05	0·12	0·28	0·71	1·21	4·85	4·35	6·09	7·50	3·32	0·72	0·16	29·36
Simla	2·60	2·92	3·11	2·98	4·72	8·21	19·83	18·09	6·31	1·16	0·35	0·96	71·24
Surat	0·04	0·03	...	...	0·12	9·78	13·36	9·82	7·35	1·31	0·09	0·03	41·93
Sylhet	0·39	1·59	5·74	13·73	21·64	32·02	25·48	25·69	20·05	8·31	1·18	0·30	156·12
Umballa	1·36	1·59	1·11	0·67	1·82	3·93	11·55	8·38	4·07	0·54	0·24	0·68	35·14
Wellington........................	0·92	0·41	2·42	3·44	4·03	3·69	3·12	3 80	3·56	8·12	8·61	3·25	45·37

TABLE showing the Mean Temperature at the principal Stations in India.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Average.
Agra	60·0	65·3	76·4	87·9	93·7	94·6	87·0	85·5	84·3	79·6	69·7	61·9	78·8
Ajmere	57·5	61·3	72·2	83·3	89·2	87·6	82·0	79·5	80·9	74·7	66·2	58 9	74·4
Akola	68·6	73·5	81·7	89·3	93·1	85·4	79·7	79·1	78·6	76 6	70·3	66·4	78·5
Allahabad	60 6	65·7	78·0	87·6	92·1	91·2	85·1	83·9	83·1	77·9	67·9	60·6	77·8
Amraoti	69 5	74·1	82·2	88·9	90 9	84·0	78 7	77 7	77·7	76·5	71·1	68·1	78·3
Bangalore	67·5	71·9	76·8	80·1	78·5	74·1	72·1	72·1	71·9	71·9	69·9	67·3	72·8
Belgaum	72·0	76·1	79·9	80·9	79·7	73·3	70·9	70·4	70·6	74·1	73·1	71·4	74·4
Bellary	73·3	78·6	85·3	89·1	88·1	83·1	80·7	80·7	79 8	78·8	75·3	72·5	80·4
Benares	60·8	66·1	77·1	87·1	91·3	91·4	85·1	84·3	83·3	78·1	68·5	60·9	77·8
Bombay.	73·9	75·4	79·0	82 5	85·0	83·1	80·9	80·1	80·0	81·0	78·9	76·8	79·7
Burdwan	66·1	70·5	79·6	85·1	84·8	84·6	83·6	82 8	83·1	80·6	73·3	66·4	78·4
Calcutta (Alipore)...........	65·1	70·9	79·0	84·4	84·8	84·5	83·0	82·4	82·4	80·1	72·5	64·9	77·8

TABLE showing the Mean Temperature at the principal Stations in India.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Average.
Calcutta (Chowringhee) ...	67·3	71·6	78·9	84·3	83·9	82·9	82·2	81·6	82·3	80·1	72·9	66·2	77·9
Coimbatore....................	73·8	77·8	81·2	83·2	81·2	78·0	76·7	76·9	77·2	76·9	75·7	73·7	77·6
Colombo	79·5	80·5	82·0	83·2	82·9	81·6	81·1	80·6	81·4	80·8	80·3	79·9	81·2
Cuttack	71·5	76·1	82·8	87·5	88·7	86·2	83·3	83·2	83·1	81·4	75·1	69 8	80·7
Dacca	66·7	71·7	79 3	83·0	83·3	83·7	83·6	83·6	83·6	81 8	75·2	68 4	78·7
Darjeeling (St. Paul's School)	39·4	41·2	47·8	53·8	55·9	59·6	60·9	60·7	58·5	54·5	47·9	41·9	51·8
Delhi	58·3	62·3	74·4	84·6	89·6	93·7	87·0	86·7	84·7	79·1	68·4	60·2	77·4
Durbhunga	62·1	64·9	75·0	83·8	84·7	85·2	84·3	83 6	83·7	79·5	71·3	63·8	76·8
Hyderabad (Sindh)	63·3	66·1	78·3	86·1	91·2	90·6	87·9	85·4	85·7	82·8	71·3	63·2	79·3
Indore	64·5	67·6	75·7	83·3	87·5	82·9	76·7	76·2	75·9	74·6	66·4	62·6	74·5
Jacobabad	57·5	61·8	74·3	83·4	91·9	95·9	93·6	90·5	87·7	78·3	64·8	58·0	78·1

Jeypore	60·7	63·5	75·9	85·4	90·1	90·6	84·0	82 1	82·7	77·6	69·3	61·9	77·8
Jubbulpore	61·9	66·4	75·8	84·8	90·6	86·5	78·8	78·3	78·6	74·1	65·7	61·0	75·2
Khandwa	66 8	71·0	80·1	87·7	92·1	86·7	79·7	78·9	78·5	76·8	69·6	65·4	77·8
Kurrachee	65·3	68·2	76·4	80·4	85·4	86·6	83·9	81·8	82 0	79·6	72·2	67·2	77·4
Lahore	54·0	59·0	69·5	81·3	88·8	93·7	89·0	88·0	84·7	77·8	64·6	55·4	75·4
Lucknow	60·7	66·2	76 8	87·4	91·8	92 8	86·3	85·5	84·7	79·8	68·9	61·1	78·4
Madras	75·8	77·4	81·8	85·1	87·4	87·7	85·5	84·5	84·2	81·3	78·4	76·1	82·0
Madura	77·2	79·5	82·2	85·7	85 7	85·0	84·3	83·4	83·0	80 7	78·8	77 1	81·9
Mangalore	77·8	77·9	80·7	83·4	82 7	77 9	76·6	76·6	77·2	78·3	78·5	76·9	78·6
Meerut	56·6	62 8	72·7	83·0	88·9	91·7	86·2	85·3	83·5	76·2	65·5	57·7	75·8
Mooltan	54·3	58·3	70·4	79·9	88·7	94 4	91·5	89·0	86·5	77·8	66 8	56·3	76·0
Mount Aboo	58·2	59·9	69·1	75·6	78·8	75 4	69·7	68·1	69·1	70·1	63·4	59·2	68·1
Nagpore	68·6	73 8	81·9	88·8	93·1	85 7	79·1	79·3	79·1	77·2	70·7	67·1	78·7
Negapatam	76·6	78·1	81·7	84·9	85·9	85·6	84·3	83·1	82·5	81·0	78·5	76·4	81·6
Patna	61·1	65·9	77·5	86·8	88·5	88 1	84·8	84·0	84·0	79 7	70·3	62·4	77·8
Poona	71·9	76·3	82·7	85·8	84·9	78·8	75·2	74·9	75·8	77·8	75·2	71·7	77·5
Quetta	40·5	40·5	50·6	58·6	67·7	74·3	76·8	75·2	66·8	56·4	45·3	41·3	57·8

TABLE showing the Mean Temperature at the principal Stations in India.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Average.
Ratnagiri	75·1	75 5	78·7	82·1	83·7	80·2	78·7	78·1	77·9	78 8	77·5	75·3	78·5
Rawalpindi	48·5	51·9	61·3	71·6	81·4	89·2	86·6	83·9	80·2	69·7	57·1	50·4	69·3
Roorkee	56·4	60·6	70·2	81·7	87·6	90·3	84·8	83·9	82·6	75·1	64·2	56·9	74·5
Salem	75·7	79·0	83·7	86·1	85·1	82·6	81·0	80·4	80·2	79·0	77·0	75·0	80·4
Sholapur	71·9	76·9	83·5	88·1	88·9	81·1	78·7	77·9	77·1	77·3	73·9	70·3	78·8
Simla	40·4	41·4	49·4	58·8	64·1	67·4	64·2	63·0	61·3	55·9	48·6	45·1	55·0
Surat	70·5	72·9	79·4	84·5	85·7	84·2	81·2	80·8	80·5	79·9	74·7	70·7	78·8
Trichinopoly	75·8	78·6	83·3	87·2	87·7	86·2	85·1	83·3	83·0	80·5	77·9	75·6	82·1
Wellington	55·3	58·3	62·7	65·1	65·6	63·4	62·5	62·4	61·9	60·6	58·3	55·6	61·0

TAB owing the aximum and M mum Temperature he ncipa Stations India.

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.			
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
Agra	82	41	89	43	103	52	110	65	116	71	114	76	101	76	99	76	99	73	97	59	90	47	80	43	116	40
Ajmere	81	37	87	37	97	47	104	66	109	64	106	72	100	73	95	73	94	66	94	52	88	41	82	39	110	35
Akola	89	43	97	47	104	54	110	64	114	71	105	70	94	70	94	70	92	67	93	55	89	45	85	42	114	42
Allahabad	83	41	90	41	103	53	111	65	116	70	111	76	97	75	96	76	96	73	93	57	86	46	80	42	116	40
Amraoti	89	48	97	53	105	59	110	67	113	72	107	69	93	68	93	69	93	65	93	58	90	50	85	48	113	48
Bangalore	83	49	89	52	94	57	96	64	97	64	92	63	88	63	88	62	86	62	85	61	83	55	80	52	97	49
Belgaum	86	52	93	52	98	58	100	62	101	64	88	65	78	65	82	64	82	62	86	59	85	53	84	52	101	50
Bellary	91	53	99	56	105	65	108	70	109	71	101	73	98	71	98	70	96	69	95	65	92	56	90	53	109	52
Benares	83	41	91	41	102	54	110	66	114	70	110	76	100	76	98	76	98	73	95	58	87	47	80	42	111	39
Bombay	89	63	88	63	91	68	92	74	92	77	92	74	87	74	87	74	86	74	91	72	90	66	89	66	93	63
Burdwan	85	49	93	49	101	59	107	68	105	69	101	73	94	76	93	76	94	75	92	67	86	55	82	48	107	47
Calcutta, Chowringhee	83	52	91	54	99	64	103	69	100	69	98	73	93	76	92	75	93	75	91	68	86	57	81	52	103	52
Coimbatore	89	57	97	57	99	64	102	70	100	68	96	69	92	68	92	68	93	67	92	67	88	63	88	57	102	55
Columbo	90	69	91	69	91	72	91	73	90	73	88	77	87	73	87	73	87	75	87	72	88	71	82	69	92	68

TABLE showing the Maximum and Minimum Temperatures at the principal Stations in India.

STATIONS.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.			
	Maximum.	Minimum.	Maximum.	Minimum	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
Cuttack	90	53	97	56	104	67	108	73	107	72	105	75	95	75	93	75	94	75	94	65	88	56	85	52	109	52
Dacca	82	49	89	49	96	60	100	67	95	68	93	73	93	76	91	76	93	75	92	68	88	57	82	52	100	49
Darjeeling (St. Paul's School)	53	32	55	25	63	38	67	41	69	41	70	49	72	55	71	54	71	52	65	42	60	35	56	31	72	25
Delhi	82	42	87	44	102	51	109	64	116	70	114	74	103	76	100	76	99	73	96	59	90	48	80	43	116	41
Durbhunga	78	47	85	47	95	57	103	64	102	67	99	71	94	77	94	75	93	74	90	66	84	55	78	49	103	46
Hyderabad (Sindh)	85	45	91	42	104	54	109	65	114	72	114	78	109	75	103	74	102	72	102	61	94	49	85	45	115	41
Indore	84	41	91	43	99	50	104	61	108	67	104	70	92	63	83	69	90	65	89	53	85	43	83	42	108	40
Jacobabad	82	35	86	36	101	47	110	60	119	67	119	77	113	76	109	76	106	71	104	54	94	42	82	38	120	34
Jeypore	82	39	88	41	101	49	107	61	113	67	110	73	101	72	97	72	98	69	97	56	90	44	82	42	113	38
Jubbulpore	84	40	90	40	101	51	106	63	112	69	108	70	93	71	91	71	92	70	91	51	85	40	81	38	112	37
Khandwa	90	41	97	46	104	52	109	65	112	71	106	72	93	72	92	71	92	69	92	57	88	44	86	41	112	41
Kurrachee	83	48	86	49	96	56	97	64	103	74	98	79	96	76	92	76	93	75	96	65	92	53	85	50	106	48
Lahore	77	37	80	38	95	46	105	56	115	63	116	74	112	75	103	74	100	69	97	54	87	41	77	37	116	35
Lucknow	83	39	89	40	101	51	108	62	113	67	109	74	99	75	99	76.	97	71	95	54	88	44	81	39	113	37

Madras	86	61	90	61	95	66	100	72	109	76	106	74	101	74	100	73	100	72	96	70	89	64	86	64	109	60
Madura	91	64	96	63	102	67	104	72	105	72	103	73	103	73	102	72	101	72	99	71	92	68	91	66	106	62
Mangalore	93	63	95	67	91	72	93	73	92	73	89	72	87	71	87	71	85	72	89	71	92	65	92	66	95	63
Meerut	80	37	86	37	99	47	105	58	111	65	110	74	100	74	99	75	97	70	95	53	87	42	78	38	111	35
Mooltan	78	37	83	38	96	46	106	60	112	64	112	76	108	75	105	76	104	73	99	56	89	42	80	38	113	37
Mount Aboo	75	42	78	40	88	52	91	61	94	63	91	44	83	59	82	61	81	63	81	58	77	50	75	48	94	42
Nagpur	89	48	97	50	105	59	101	67	116	72	108	71	94	71	94	72	92	70	93	59	88	50	83	48	116	47
Negapatam	83	64	86	64	93	68	100	74	105	75	103	73	101	76	99	73	97	73	96	71	88	68	85	67	106	63
Patna	79	44	86	45	100	56	107	68	109	70	103	72	97	76	96	76	97	75	93	64	86	51	79	46	110	43
Poona	89	47	97	49	102	54	106	63	106	65	94	69	86	68	89	66	87	64	90	56	89	47	87	46	107	46
Quetta	66	19	68	21	75	27	82	37	93	42	99	50	98	54	95	52	92	42	82	31	71	22	67	20	99	17
Ratnagiri	94	61	94	61	92	67	94	73	94	75	90	73	86	73	86	72	86	72	95	65	95	61	93	62	98	59
Rawalpindi	72	32	75	33	87	39	97	49	111	57	114	68	111	70	103	68	98	63	93	47	82	34	73	31	114	30
Roorkee	79	37	84	37	97	46	106	57	112	65	111	71	100	72	98	73	97	67	94	52	86	42	78	37	112	36
Salem	90	57	97	57	102	62	104	71	105	69	100	71	98	70	95	69	95	68	94	66	90	61	88	57	105	59
Sholapur	90	48	98	54	104	61	109	69	109	71	102	67	95	68	95	68	93	68	93	60	91	51	88	49	110	46
Simla	62	28	60	28	73	31	78	43	86	46	86	52	78	57	76	56	75	54	72	43	66	37	65	36	87	27
Surat	92	50	99	50	103	58	109	67	108	70	99	74	93	74	91	74	90	71	95	62	93	53	90	51	110	48
Trichinopoly	89	61	96	62	102	66	105	72	106	72	104	75	101	75	100	72	99	72	97	71	92	66	90	62	107	61
Wellington	70	38	75	39	78	46	80	53	80	55	77	53	76	54	75	54	75	51	73	49	71	44	73	40	80	37

CAUTION IN THE USE OF THE TABLE OF TEMPERATURE.

SOME residents in stations in Northern India who read the temperature table may think errors have been made because, for instance, the minimum temperature at Lahore is given at 35°, while it is well known that frost occurs at that station and water freezes at 32°. In taking the observations given in the tables, the thermometer is placed a few feet above the ground and protected by a wooden roof from the direct action of the rays of the sun: this roof also prevents loss of heat by radiation at night.

This arrangement is necessary, because radiation varies with the altitude and the season of the year, as is shown in the accompanying table. For instance, at Mount Aboo, altitude 3,945 feet, the difference between one thermometer exposed to the air and another covered by a roof is over 18° in January and 2½° in July. At Bombay, altitude 37 feet, the loss by radiation is 9° in January and 4·4° in July.

EXCESS OF TEMPERATURE UNDER DIRECT EXPOSURE TO THE SUN.

Perhaps some poor cultivator of tropical plants in Europe may read this book and say—"Well, I have worked in as high a temperature nearly all my life: that country must be agreeable to live in." To such I would invite attention to the column of MEAN INSOLATION, which gives the average difference between a thermometer exposed to the sun and the shade temperature, which is given in the principal table. The difference will be found to average 55°, which must be added to the maximum given in the table to find the temperature which plants and men exposed to the sun must bear.

TABLE showing the Nocturnal Radiation and Mean Insolation at a few important Stations.

	Height above the Sea.	Nocturnal Radiation.		Mean Insolation.
		January.	July.	
Mount Aboo	3,945	18·7°	2·5°	62·7°
Bombay	37	9°	4·4°	55·2°
Calcutta	21	9·2°	2·3°	56·9°
Poona	1,849	13·5°	4·4°	54·9°
Lahore	731	9·2°	3·8°	54·5°

GROUND TEMPERATURE OR BOTTOM-HEAT.

THE value of the following table will be specially understood by readers who have studied the cultivation of tropical plants in temperate countries, where "bottom-heat," as the temperature of the soil is called, is indispensable for the propagation by cuttings of a great majority of tropical plants:—

AVERAGE MONTHLY Mean Temperatures of the ground at the surface and at a depth of 3 feet.

		No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Mean.
CALCUTTA (Alipore).	Surface	5—6	64·4	71·2	82·7	91·3	90·4	87·5	86·2	85·9	86·0	83·2	73·3	64·8	80·6
	3 feet deep.	5—6	72·5	74·1	78·4	84·5	87·1	87·2	86·4	86·1	86·1	85·2	81·0	75·1	82·0
ALLAHABAD.	¼ inch deep.	3—4	62·8	68·2	78·9	92·8	97·3	93·5	86·8	87·4	87·3	82·2	70·1	62·6	80·8
	3 feet deep.	3—4	69·7	70·6	76·2	83·6	89·2	91·0	88·1	87·3	87·1	84·7	78·2	71·8	81·5

PREPARATION OF THE SOIL.

DEEP thorough working is, in all countries, the mainspring of success in cultivation; but if deep working is of great importance in temperate climates, it is doubly so in this country, because at a distance from the surface a constant supply of water is available for the wants of the plant, and if the soil is deeply worked, the roots reach this water and are beyond the scorching power of the sun, therefore growth goes on steadily and much less watering is necessary. Dry weather should invariably be selected for digging, and, if possible, for all kinds of soil working. When the sun dries up a soil that has been trodden on while wet it breaks into lumps, and in this state is unable to receive the beneficial influence of air and water. Repeated digging at intervals of a month during the hot season has a wonderful effect in fertilizing the soil by bringing the plant-food it contains into a condition to be readily taken up by the roots; and hurried preparation of the soil immediately before it is required should be avoided, as the air requires time to act on the freshly turned-up earth.

The theory of the effects of tillage is given by Warington "Chemistry of the Farm":—

"By tillage the surface soil is kept in an open porous condition, favourable for the distribution of roots. By this means also capillary attraction is diminished and the land consequently suffers less from drought: the water-holding power of the surface soil is also increased. A more important result of tillage is that the soil is thoroughly exposed to the influence of the air. Soils containing humours or clay will absorb ammonia from the atmosphere and thus increase the store of nitrogen. The organic remains of former crops and manuring are also oxidised, the nitrogen being converted into nitric acid. The rocky fragments which a soil contains, as fragments of silicates or limestone, will at the same time be more or less disintegrated by the combined action of water and air, assisted by the carbonic and humic acids arising from the oxidation of vegetable matter, and a portion of the insoluble plant-food be thus brought into a state suited for assimilation by the roots of crops."

EFFECTS OF CHANGE IN TEMPERATURE.

THE great change of temperature to which the mineral fragments of dry soil are subjected daily when raised to a temperature of 150° F. by day and lowered to 80° F. by night causes such expansion and contraction as lays open a new surface which in total must be immense, and to this undoubtedly much of the effect of repeated tillage during hot weather is due.

THE STIRRING UP OF SOIL BETWEEN GROWING CROPS

Is admitted to be of great advantage. Probably this is due to "breaking the capillarity of the soil;" but in hot countries much of the effect may be due to the lower layers of the soil being sufficiently cold to bring the hot, moisture-laden air to the dew point, and cause it to deposit its watery burden.

THE COMPOSITION OF PLANTS.

THE chemical composition of plants and soils illustrates to some extent the effects of manures and is worthy of careful study. The variation in the composition of plants is considerable, and of many garden plants has not been worked out, but the following statement of the composition of 5 tons of meadow grass given by Warington in his valuable text book, the "Chemistry of the Farm," may be accepted as fairly typical of garden produce in a fresh green state, such as culinary vegetables :—

Water				8,378 lbs.
Carbon	1,315	lbs	Combustible...	2,613 ,,
Hydrogen	144	,,		
Nitrogen	49	,,		
Oxygen and sulphur	1,105	,,		
Potash	56·3	,,	Ash	209 lbs.
Soda	11 9	,,		
Lime	28·1	,,		
Magnesia	10·1	,,		
Oxide of iron	·9			
Phosphoric acid	12·7			
Sulphuric ,,	10·8			
Chlorine	16·2			
Silica	57·2			
Sand, &c.	4·5			
				11,200 lbs.

The percentage composition is probably more easy for the mind to grasp; it will be found to contain water, 83·78; combustible matter, 26·13; and ash, 2·09.

The CARBON of plants is derived from carbonic acid, a compound of carbon and oxygen, forming $\frac{1}{2,500}$ part of so-called pure air, but forming 4 per cent of expired air, as it leaves the lungs of man. In the presence of the green colouring matter of plants (chlorophyll) by means of light the carbonic acid is decomposed in the leaves and green bark. The carbon fixed in the plant forming about one-half of the dry combustible part, the oxygen is set free and returns to the atmosphere.

OXYGEN and HYDROGEN exist in the plant chiefly as the compound water, forming by far the largest constituent of living plants.

In a green vegetable, such as the cabbage, it forms	about	85	per cent.
In potatoes	,,	75	,,
In freshly cut timber	,,	50	,,
In dry seeds, such as peas and wheat.	,,	14	,,
In oil-seed	,,	7	,,

ASH CONSTITUENTS.

In analysis of plants a portion of the sulphur which is uncombined goes off in combustion, and is shown in the above analysis with oxygen forming together 11·05 per cent., but of this quantity sulphur forms a very small part.

The WATER, NITROGEN, SULPHUR, and ASH CONSTITUENTS are taken up by the roots and the CARBON by the leaves and green bark.

The ash constituents of esculent vegetables amount to about 2 per cent. of the fresh vegetable, but the timber of free-growing trees contains 0·2 to 0·4 of ash constituents in 100 of dry matter. In seeds free from husk the proportion of ash is generally from 2 to 5 per cent of the dry matter.

The ash of old fallen leaves will amount to from 10 to 25 per cent of the dry matter.

MANURE.

MANURE may be defined as matter capable of increasing the fertility of the soil. From the earliest times all kinds of garbage in a more or less decomposed state has been used for manure, and it is, perhaps, from a sanitary point of view, fortunate that the habit of burying such material in the soil as manure has been formed. Of recent years chemistry has done much to enlighten us regarding what really is manure. Chemistry shows us the constituents of soils and plants, and clearly proves that material only is manure which is *wanting* in the soil or which is capable to setting free in the soil constituents that were not previously available. Of the materials required by plants from the soil yet present in small proportion, NITROGEN, PHOSPHORIC ACID, and POTASH are specially important. A manure containing all these materials is distinctively called a general manure; that which contains only one or two is called a special manure. The general manure is well represented by the mixture of the excreta of different kinds of animals called farm-yard manure, which is collected near cultivators' houses. A *special* manure is represented by saltpetre, *nitrate of potash (sorakhar)*, which supplies the plant with two of the necessary ingredients, nitrogen and potash.

The quantities of those three valuable ingredients which exist in ordinary garbage are very small, being per ton—

Nitrogen	9 to 15 lbs.
Phosphoric acid	9 to 15 lbs.
Potash	4 to 9 lbs.

The vegetable matter of garbage is valuable, because by its decay it produces carbonic acid which is dissolved in water, and thereby acts on rock, specially on such as contain lime, causing disintegration and setting free a fresh supply of mineral matter to be taken up by the plant.

THE FERMENTATION OF MANURE.

If a mass of town sweepings or garbage is laid up in a heap, fermentation quickly sets in and much heat is evolved, accompanied by a strong smell of ammonia. That smell shows that the ammonia, containing nitrogen, one of the three valuable ingredients of manure, is passing away into the air, and the inside of the heap of manure will soon appear dry and white; it then has lost a large part of its most valuable ingredient.

Keep the manure in a pit where it can be kept wet, yet not where water will flow over it. The ammonia which otherwise would have gone off into the air will then be retained in the black liquid which oozes from the manure heap. This liquid should be carefully collected and thrown back upon the heap.

CHARACTERISTICS OF THE CLASSES OF MANURES.

Manures containing much nitrogen are specially adapted for producing luxurious growth and great leaf development. It must not be supposed that nitrogenous matter alone will produce that effect; all the ash constituents of plants must be present in the soil to produce luxuriant growth; but when nitrogenous matter is abundant, the effect is, as stated, rapid growth and great leaf development. This kind of growth is specially suited for vegetables and for a few plants of which the fruit is eaten; for instance, cucumbers (cakree), melons (curbooza), grapes (angoor), and bananas (kela), all of which thrive with such manure; but the mango and orange and other fruit trees, if stimulated to growth by such manures, will not bear fruit. Nitrogenous manures are suitable for such plants while young, to produce growth and increase their size before the natural fruiting season comes on; but when the natural age for bearing fruit has arrived, such manure would induce strong leafy growth and the fruit would be short in proportion. Manures of this class can only be used successfully in conjunction with abundant water.

NITROGENOUS MANURES WHICH ARE READILY AVAILABLE IN INDIA.

Excreta of men and animals, especially such as eat flesh.

Fresh bones, blood, flesh, fish, saltpetre (*sorakhar*), oil-cake, horns, urine, poudrette, dung of pigeons, fowls, and bats.

EFFECT OF PHOSPHATIC MANURE.

Phosphatic manure chiefly affects the production of seed, increasing the quantity and improving the quality. All good soils contain a very small proportion of phosphoric acid. In the richest soils the proportion rarely exceeds ½ lb. in 100 lbs.

Some countries are rich in special deposits of phosphatic minerals, but similar deposits hitherto found in India are so few and so limited in extent as to be practically of little value. To maintain our supply of phosphatic manure we must preserve the bones of animals. The phosphate of lime as it exists in bones is insoluble, and is useless as manure until it is made soluble. The system in which this process is carried on in England is:—The bones are boiled to remove the fat, then crushed into dust by powerful mills, soaked with water, and sulphuric acid, equal to the weight of the bones, diluted with an equal measure of water, is added. This process is not practicable in Indian gardens, therefore another must be found. The bones may be burned, then easily crushed into dust, and the bone ash mixed with garbage in a pit and kept moist for six months or so. The carbolic acid produced by the decaying garbage will slowly dissolve the bone ash.

This system involves a loss of ammonia which is driven off in burning, and a very disagreeable penetrating smell is produced; therefore the process must be carried out in a retired spot. If our soils were rich in vegetable matter the bone ash might be applied directly to the soil; but in the plains of India vegetable matter decomposes so fast that it cannot accumulate, and there is not sufficient decomposing vegetable matter to dissolve bone ash. In the hills the case is different. Bone ash may be applied directly to the soil with the prospect of long continued advantage.

A habit some of the cooks in India have of burning bones in their kitchen fires to save other fuel renders the ashes more valuable for manure than otherwise would be the case.

MANURES CONTAINING A CONSIDERABLE PROPORTION OF PHOSPHORIC ACID WHICH ARE EASILY PROCURABLE IN INDIA.

Burned bones, oil-cake, excreta of men and animals, fish, ashes of dung-cakes; dung of fowls, pigeons, and bats; phosphatic guano is occasionally imported.

POTASH MANURES.

Of the three important ingredients in manure, potash is generally the most plentiful in soils: it occurs in considerable quantity in the ashes of wood, especially in young branches, in cowdung ash, and in saltpetre *(sorakhar)*.

GENERAL MANURES.

Although there are certain materials that lay a special claim to the name "manure," there is very little either in the animal or vegetable kingdom that may not in some degree share the title. All kinds of animal and vegetable refuse will assist in bringing the soil into a soluble form, so as to be taken up by plants. Among familiar objects, bones, charcoal-dust, and kitchen refuse are specially valuable. The golden rule of the garden is that nothing but the "produce" should go outside. All refuse of whatever kind should be buried in the soil, and the earlier this is done the more plant-food will the material furnish. If thrown into a corner to decay, it will only poison the atmosphere with exhalations that might have given fragrance to a rose or size and delicacy to a cauliflower; but such crude manures should not be buried within immediate reach of the roots of delicate plants.

POUDRETTE MANURE.

Of all the manures that are available in the neighbourhood of cantonments for growing flowers and vegetables, there is none to be compared to NIGHT-SOIL that has been mixed with soil and buried in a pit for a few months. A common practice is to throw the night-soil into a pit, and, when nearly full, a coating of soil is thrown on to cover it. That is a good way to create a nuisance and to spoil a very valuable manure. A quantity of well-pulverised soil, as dry as can be procured, should be thrown over the night-soil as soon as it is put into the pit. If the soil is very dry, one part to two of night-soil will be sufficient; but if more is applied, the result is better. By this means a manure of the very highest value may be made, and on taking it out, about nine months after, it will be found to have no disagreeable smell whatever. The gases that would have caused a disagreeable smell will have been absorbed by the soil and be ready to act as plant-food. Of this manure a wheel-barrow-load to ten square yards of ground or about a spadeful for each plant of cabbage or cauliflower is sufficient for high cultivation. After applying this manure, regular watering is quite essential; therefore it should not be used for plants that do not require watering, nor for grain crops or fruit trees. For all kinds of culinary vegetables and flowering plants, in which rapid growth is desirable, this prepared night-soil or poudrette, with the regular watering that is necessary, is the most valuable we have. Night-soil pits should be dug in a dry situation not subject to be flooded by water and with a good deep soil.

URINE

Is also a very valuable manure, and specially so for beet and all the cabbage tribe. It should be collected by putting dry soil into the urine pans. Equal quantities of dry soil and urine form a compost that can be worked without any disagreeable effects after it is dried slightly. In this condition it is useful for crops that are naturally of rapid growth and require regular watering.

ASHES.

The ashes from the dung cakes that are the common fuel of this country form a very good manure, of which there is little danger of using too much when mixed with half-decayed leaves and other sweepings as it is generally found. This manure is specially good for soils that are hard and retentive of water, or where drainage is defective and for producing grain crops and fruit trees in bearing.

BULLOCK-DUNG

Is an excellent manure and of a generally useful character. If old and well decayed, it is fit for the most delicate plants, and is the best manure for roses and other plants of a like nature. It makes an excellent liquid manure, whether old or fresh, and is specially required for balsams and other plants of a like nature.

SHEEP AND GOAT DUNG

Is a very powerful manure. It should be used in the form of a liquid by soaking in water and watering the plants with a weak solution ; or in the case of plants in pots it may be laid on the surface, so that its properties may be carried down into the soil gradually.

HORSE DUNG,

Unless well rotted, has a burning tendency, and requires abundant supplies of water to enable it to benefit garden plants in a striking degree; but if prepared carefully by mixing the dung with other garbage and some earth and *keeping moist* in a pit, it is one of the best of general manures. If laid up in a dry heap till it becomes white and mouldy it is of little value.

LEAF MOULD

Is of the greatest service to all garden plants, and for many of a delicate nature is essentially necessary. It may be made by burying dead leaves in a pit. If kept moist, six months will be sufficient to make them decay. When reduced to the condition of fine mould, they are ready for use. This mould, mixed with one-fourth sand, or in its absence pounded brick and one-fourth common soil, is the best compost for seeds to germinate in. With a larger proportion of sand, say about one-half, it makes an excellent compost for striking cuttings.

Leaf mould contains a large proportion of the earthy matter which plants take up in the finest possible state of division and is therefore in a condition to become soluble readily. Its tendency to retain moisture is also of special value in a dry climate.

DRY MANURES

Of whatever kind should be well dug into the soil. Left near the surface, they yield up to the atmosphere the constituents that form the most valuable plant-food.

GREEN MANURE,

That is, fresh weeds and prunings of all kinds, form an excellent manure specially suited for thin, stony soils. The prunings of prickly-pear fences may be disposed of in this way with great advantage. When buried at least six inches beneath the surface and kept moist, there is no danger of the prickly-pear growing up again. If well bruised with a mallet previously, decay is more rapid. It is an excellent plan to keep a trench always open into which such sweepings and cuttings may be thrown day by day and covered up with soil immediately.

LIQUID MANURE

Is in many cases the most convenient form in which to supply nourishment to crops, and is of special service if well rotted manure is not available at the planting time. It can be made by soaking dung of any kind of cattle in water for about one day. Fresh horse-dung, which in a dry state is injurious to many crops, can be used for this purpose with great advantage.

Liquid manure should be applied during rainy weather, or by mixing a small quantity at a time with the water that is usually given.

CHARCOAL DUST.

This material may at times be found in the bazaars at a very low rate. It is valuable in potting composts for keeping soils open; and if kept in contact with other manures, it will absorb the ammonia given off and facilitate its conversion into nitric acid preparatory to acting as manure.

SALTPETRE

Must be used with special care, because it is such a powerful stimulant that plants are easily killed with it. 500 lbs. weight per acre is sufficient for vegetable crops. It should be given in at least four doses so as to ensure equal distribution ; and if a week of moist weather or half an inch of irrigation water comes between each dose, the effect will be satisfactory.

This manure is adapted for plants of rapid growth under irrigation only.

SUPERPHOSPHATE.

As salpetre supplies only nitrogen and potash, the effect it produces as manure is greatly increased by mixing with equal parts of superphosphate of lime, which may be prepared by mixing three parts bone-ash thoroughly soaked with water with one part sulphuric acid diluted with an equal weight of water in a wooden or leaden trough without iron nails.

GENERAL MANURE WITHOUT SMELL.

As a general manure specially fit for use near a dwelling-house or in a public place, because it has no disagreeable smell, is a mixture of one part of saltpetre, two parts of superphosphate of lime, and one part of sulphate of lime.

IRRIGATION AND WATERING.

HOW much water should be given to particular plants and how much should be provided for gardens are questions that are very often asked and are very difficult to answer distinctly; so much depends on local and particular circumstances; but the following notes, aided by intelligent observation, may be taken as a safe guide. Fifty tons of water per acre* weekly is a fair allowance for mixed crops on an average soil in the dry climate of the Deccan. In like circumstances a crop of lucern will take seventy tons and sugarcane and bananas one hundred tons per acre weekly.

An ordinary "bheestie's" bullock carries 30 gallons or 300 lbs. of water, and makes about eight trips daily a distance of five hundred yards, therefore one bheestie is able to water about one-fifth of an acre† of retentive soil.

Young plants and such as have been lately transplanted require water often and in small quantities. Once a day is a fair allowance for such. Well-established plants growing in the ground are better if they get a good supply at longer intervals; for instance, an ordinary sized rose tree thrives better with four gallons of water once in five days than with one gallon daily, because the large supply of water goes to some depth into the ground, while the small supply is absorbed by the surface soil and much of it is lost by evaporation. The large supply at long intervals causes the roots to go to some depth into the soil, where equable conditions are maintained and steady growth is the result. A small supply at short intervals keeps the roots near the surface subject to frequent change of moisture and temperature. Plants in pots and tubs require much more water than the same plants would require if planted in the ground, and the quantity that should be given to pot plants should be regulated by the relative size of the plants and the pot. If the plant is large in proportion to the pot and the soil full of roots, the plant will receive water daily in dry weather with benefit; if the plants get more water daily than the roots can absorb, or if the drainage is imperfect, the water will stagnate and the soil become sour. In this state it is quite unfitted for garden plants. Although many ferns will enjoy water dripping over them for some months at a time, stagnant water will soon injure them.

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* An acre is 4,840 square yards, nearly 70 yards by 70 yards. One ton of water is 224 gallons, 35·9 cubic feet.

† Half an inch of water over the surface of an acre is nearly 50 tons.

MACHINES FOR DRAWING WATER.

THE MOTE.

When irrigation is done by drawing water from a well more than twenty feet deep, a leathern bucket with a wide pipe from the bottom, called a "mote," is generally used. The "mote" is made of hides sewn together in the form of a circle about six feet wide when the edges are fastened up to the iron ring which forms the mouth, and the end of the pipe from the bottom being held up, it makes a bag capable of holding 40 gallons of water. This is easily drawn up by a pair of stout bullocks, and the pipe from the bottom of the bag being conveyed over a pulley a few feet lower than the mouth of the bag rises, forms a simple yet effective arrangement for drawing the water. When the depth of the well is about 25 feet, an ordinary pair of oxen will raise the "mote" forty-five times an hour. This, with the hire of a man and a pair of oxen at 12 annas per day of eight hours, gives the cost of raising water by this means, leaving an ample margin for contingencies, at one anna per 1,000 gallons. The area that a mote with one pair of bullocks will water is about half an acre daily.

THE DOUBLE MOTE.

The double mote is a contrivance by which two buckets are kept in motion by one pair of bullocks, or, better, by one powerful bullock. One bucket ascends while another descends, so that one balances the other and the weight of water only has to be lifted.

In this arrangement the bullocks walk in a circle continuously in one direction, turning a large drum on which the bucket ropes are wound and unwound, a simple reversing gear causing the drum to turn now in one direction, now in another. This machine is subject to a considerable strain, and to be durable must be substantially built.

The cost of lifting water, including interest on the cost of the lift, assuming that a man and a pair of bullocks may be hired for 12 annas per day, is one anna per 1,500 gallons. Many examples of the double mote are to be met with throughout, which have been unsubstantially built, and in consequence have soon fallen into disorder and been unfairly condemned. The condemned examples are chiefly the work of country carpenters, whose skill is not equal to this class of work.

PERSIAN WHEEL.

When the water has to be lifted less than 20 feet, the Persian wheel will be found very convenient; it has the advantage that it can be worked by a man. The cost of raising water 15 feet with this machine by manual labour is about the same as raising it 25 feet by the mote with bullock power.

IMPROVED WATER LIFT.

This machine is an improved form of the Persian wheel or *rhat*.

Assuming that the cost of a man and a pair of good bullocks per day of eight hours is annas 12, the cost of lifting water by this machine, including interest on the original expenses, is about 1 anna per 1,500 gallons for 25 feet.

THE PYCOTTAH.

The instrument known as the *pycottah* at Madras and as the *shaduf* in Egypt is very convenient for raising water about 5 feet. It is simply a pole suspended with one end over the water, to this end a bucket is attached by a stiff rod, with which the operator brings down the bucket, plunges it into the water, then with a smart jerk raises it to the level of a trough fitted to convey the water to the field. One man can lift in this way 15 tons of water per day of ten hours a height of 5 feet—sufficient to water thoroughly one quarter of an acre.

PREPARATION OF THE GROUND FOR IRRIGATION.

For vegetable crops it is much better to cause the water to flow over the ground in channels than to carry the water in pots. The ground should be laid out in beds by ridges running at right angles to each other. Two parallel ridges, drawn a foot apart, form a water channel, and if the ground is nearly level one such channel is sufficient for two lines of beds; if sloping much, a water channel is required for each line. Six feet by nine feet is a good size for beds, but if the flow of water is strong, they may be made much larger.

If the soil is of such a nature that the water drains freely through, it will receive much more water with benefit to the crops than if it is of a retentive nature. In a free-draining soil crops that are of rapid growth, such as cabbage, cucumber, &c., may be watered once in four days during dry weather, and they will thrive better under such circumstances than if the soil retains water any length of time. A soil in which water stagnates is quite unsuited for a garden.

Water from bath-rooms should invariably be utilized in gardens, as it contains much plant-food. If pure water is procurable, watering plants overhead during the evening when the sun is low is beneficial, as it checks evaporarion from the leaves and removes dust; but watering overhead while strong sunshine is on the plant is injurious.

Watering should as a rule be done in the evening; but during the prevalence of cold east winds the morning is preferable.

DRAINAGE.

This term implies the removal of superfluous water from the soil, one of the first essentials in the cultivation of the great majority of garden plants. The effects of drainage that are specially important in this country are the passage of water from the surface to the lower strata of the soil assisting the passage of air and other fertilising gases and promoting the decomposition of organic matter in the soil and the consequent solution of some of the mineral portions of the soil which is necessary for plants.

Soil which has the interstices between its particles filled with water in a slowly moving state is necessary for some plants, but they are comparatively very few and their cultivation is separately dealt with.

When a garden is irrigated from a well near at hand it is probably that no special attention to drainage may be necessary. The water finding its level in the well may be actually a most efficient form of drainage which will be sufficient to account for the supposed superiority of well water compared with canal water, which obtains in some parts of the country. When canal water is used and the lower strata of the soil are not open some artificial system must be adopted. Drain pipes, such as are used in field culture in Europe, have been tried with only temporary effect, the roots of trees appear to rejoice in the new opening and quickly fill it up with a perfect mat-work of fibres. Open drains four feet deep are thoroughly effectual, but occupy too much land, and there is a danger of the surface water finding its way into them and defeating the primary reason for draining, which is not so much to dry the land as to cause the water to pass through it, carrying with it atmospheric air and other fertilising gases.

In one instance a small temporary well ten feet deep surrounded by a clump of Casuarina trees proved a perfect draining apparatus. The well was kept nearly dry for a year by the use of a bucket fastened to a pole suspended from a triangle, a temporary shaduf, pycottah, or denklera, afterwards the Casuarina trees took up the work, and no more complaints of imperfect drainage were made from that garden.

The quantity of water which Casuarina trees are capable of extracting from the soil must be very great. Early in the morning the water may be seen dropping from the pendulous branches at a time when there is no dew on other plants, and the atmospheric conditions are such as to preclude the idea of this water being dew.

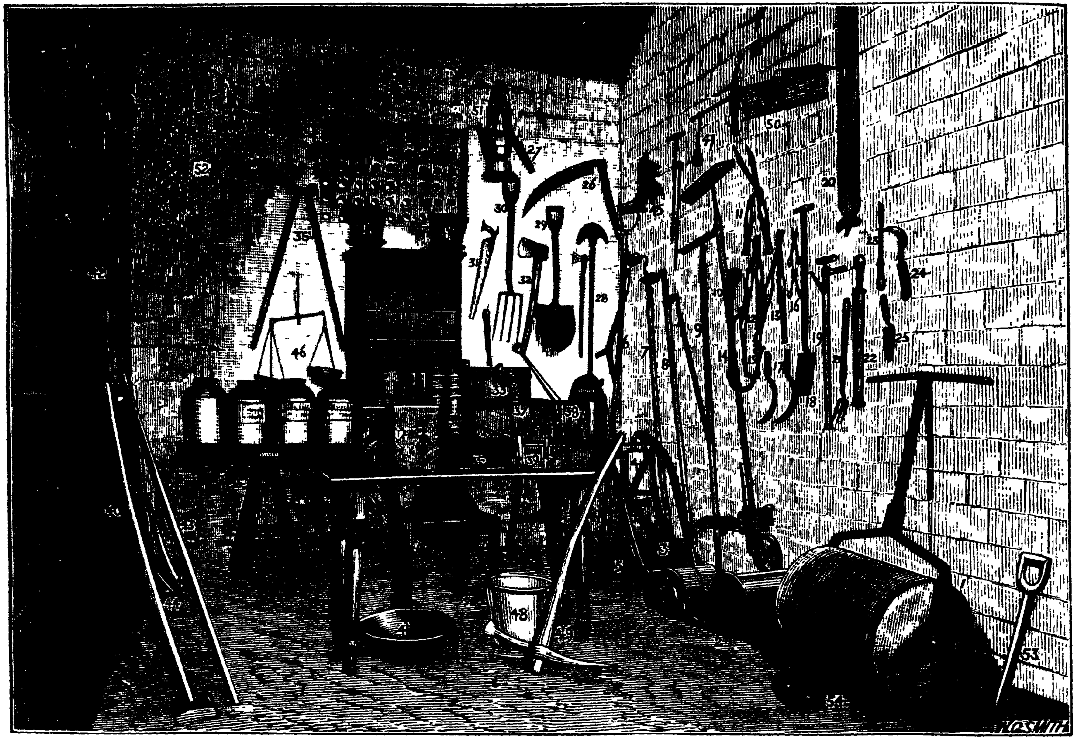
PLANT LABELS.

WHITE-ANTS prohibit the use of the white painted deal-wood labels so common in Europe; but we have a fairly satisfactory arrangement in labels of sheet zinc, written with perchloride of platinum much diluted with water used with a quill pen; the solution should be as weak as will give a black mark on clean zinc; if too strong it corrodes the zinc and washes off. This label has some disadvantages. If the zinc is clean and bright when written upon, it may oxidize to such an extent that the writing will in a few days become very obscure; but it may be made legible again by scraping off the white oxide of zinc.

A REALLY DURABLE LABEL is a slip of zinc with a number stamped on it by a steel stamp fastened to the tree loosely by a galvanised wire, the number referring to a book giving full particulars, which should be kept in duplicate. This system appears troublesome at first, but in practice it is not so. The book may contain more information than any label could give, and there are other obvious advantages. This book, for instance, might have serial numbers affixed to the names of the plants mentioned.

FIXING LABELS TO TREES.

It is sometimes necessary to fix labels to trees. In this case the label should be as small as can be seen easily, because a large label catches the wind and by swinging to and fro day and night quickly cuts a slit in the zinc and falls off. The wire of a label should be fixed by a large loop to a side branch of a tree, so that it may not do serious mischief if it becomes tight.



HOU' AN NDI GARDEN.

GARDENING TOOLS AND IMPLEMENTS.

IN our illustration of gardening tools the sequence of the numbers is not exactly such as would be naturally adopted, still it is desirable to retain the arrangement given in the picture. Therefore to be noticed first is

No. 1.—*The Roller used for making paths and lawns firm and smooth.*—Frequent rolling on the lawn has a tendency to produce short dense growths of grass and renders paths comfortable to walk upon. It may be made of stone, but cast-iron filled up with cement concrete is more durable. If the bearings are kept greased such a roller will last many years; a suitable size for two men to work is 2 feet long by 1½ feet diameter and costs about Rs. 20.

No. 2.—*Mowing Machine for cutting short grass.*—This implement needs care to keep it well oiled and all bolts at a proper degree of tightness. The setting of the revolving cutter upon the fixed one (the ledger blade) so as to leave not more space between them than will admit a sheet of ordinary paper should be attended to. Some mowers are arranged to permit the revolving cutter to be reversed, so that as one side of the cutting blades become dull the cutter may be reversed and thereby sharpen itself. To sharpen a lawn mower a handle is provided, which fits into one of the wheels and allows the cutter to be revolved rapidly without making progress, while a file held against the cutters grinds the edges. It is advisable to get this work done by a mechanic. Let the mower be carefully cleaned, dried, and oiled at the end of every day's work.

The price of a mower to cut 12 inches is about Rs. 60 and 18 inches about Rs. 80. The higher priced machines will often be found the cheaper in the end from their great durability.

No. 3.—*Plough.*—Every garden of considerable size should have a small plough, because ploughing is much cheaper than digging. The cost of such an implement is about Rs. 30.

No. 4.—*Watering Pots*—Should be provided of three sizes to suit different kinds of work and the varied capacity of the hands employed. For garden work no watering pot should be larger than 3-gallon capacity. Sets of 2-gallon and 1-gallon capacity should also be provided. Tinned or zinc-coated sheet iron is generally used. The "rose" or water-spreader should be of brass and with the perforated face removeable by a screw. The gradual taper of the spout from the base to the point shown in the illustration is a desirable feature. The cost of a well made watering pot runs from Rs. 1½ to Rs. 3, according to size.

No. 5.—*Hoe* (*Powra*).—The hoe is a very important implement in Indian gardens, because a great deal of soil-stirring, weed-cutting, and irrigation water-tending is done with it.

If the blade is of good steel it will cost about 10 annas. The handle should be of the toughest wood locally procurable. Babul (*Acacia arabica*) or dhaman (*Grewia tiliæfolia*) make excellent handles, but Ash handles appear to be better than any native timber for this purpose.

No. 6.—*Dutch Hoe.*—This tool is used for cutting down annual weeds between rows of plants or on footpaths. In using it the workman moves backwards, resting the blade on the ground and pushing it from him so as to cut down any plants that are in its way. The use of this instrument should be followed by the rake and roller. If used at short intervals it will keep the paths in good order. This tool is immensely more effective than any native instrument for the same work. The cost of the blade is Re. 1. The handle may be of bamboo.

No. 7.—*The Swan-neck Weeding Hoe*—and

No. 8.—*The Common Weeding Hoe*—Are used for cutting down weeds, and in active hands are very effectual tools. Cost Re. 1 each.

No. 9.—*The Rake*—Is an indispensable instrument in the garden. It is used for smoothing the surface of seed-beds and footpaths. Its price in India should be about 1½ annas per tooth.

No. 10.—*The Daisy Rake.*—An instrument designed to cut the flowers off dwarf-growing weeds and prevent seed from forming. It will be found useful in India against the American weed, *Tridax procumbens*, and similar plants.

No. 11.—*Pruning Shears for clipping edgings.*—This instrument is in constant use and is a very satisfactory tool. Without it *Alternanthera* edgings cannot be kept in order. The best quality of this tool is sold at Re. 3 each.

No. 12.—*Pruning Shears*—Of this form will cut a branch of a tree 1 inch in thickness with ease. In using it care should be taken to *keep the blades at right angles to the branch to be cut.* If this is not attended to, it is easy to break the tool.

No. 13.—In this form of *Pruning Shears* one blade slides so as to give a drawing cut and makes a cleaner wound than the other. In this also the *blades must be kept at right angles to the branch to be cut.*

No. 14.—*Pruning Saw.*— This saw is designed for cutting green wood. Its blade is thicker than an ordinary saw, and the teeth have a set adapted for this work.

No. 15.—*A Wrench*—Is one of the accessories of a mowing machine. The form depicted in the illustration is very convenient.

No. 16.—*Flower-gathering Scissors*—Which enable one to cut and bring away the flower with one hand, are useful at times.

No. 17.—*The Sickle.*—The instrument depicted is of a small size, of good design, made of excellent steel, and is sold for 12 annas in Bombay.

No. 18.—*The Spade.*—A miniature form, suitable for stirring the earth between plants in flower-beds. In few parts of India is the ordinary spade a practicable tool, the workmen being too light to handle the spade effectually.

No. 19.—*The Holborn Pump.*—A very useful engine for squirting water over plants to remove dust or insects from the foliage. When used, its base is placed in a bucket of water. Such pumps are advertised at Rs. 6 each.

No. 20.—*The Cross-cut Saw.*—For cutting logs of timber transversly.

No. 21.—*The Syringe.*—A rather old-fashioned squirt for throwing water on plants to clean them and to moisten the atmosphere.

No. 22.—*The Asparagus Knife.*—Used for cutting the shoots of that vegetable under the surface of the ground.

No. 24.—*The Coorpee, or native weeding hook.*—A useful little instrument in re-potting large plants, for stirring the hardened soil, but one of which the "mallee" is much too fond—he would use it for every kind of work.

No. 25.—*Transplanting Trowel.*—A trowel with a curved blade used in transplanting small plants.

No. 26.—*Scythe.*—The most effectual tool for cutting long grass or corn. Its edge is kept very keen by the use of

No. 27.—*The Scythe Stone*—Which is drawn lightly along the edge of the scythe by short rapid strokes directed. The scythe figured is a short heavy pattern, found to be well adapted for native labourers. It is procurable from Thomson and Sons, Iron Merchants, Calcutta, for about Rs. 5.

No. 28.—*Edging Cutters.*—Where grass adjoins the footpath the grass will at times encroach and make an untidy margin. To keep the edge cut cleanly this tool is used.

No. 29.—*Shovel.*—This is a very light but strong specimen of a very useful instrument for spreading gravel or earth, removing rubbish, and many other purposes. The price in Bombay is Re. 1-6.

No. 30.—*Digging Fork.*—One of the most important tools in the garden. If skilfully used on stiff soil it is excellent for tilling the ground. In digging, the workman should first open a clean trench one foot deep and six inches wide at one end of the plot to be dug. The soil may be carried to the place where the digging is to be finished if great neatness is desirable. When the first trench is completed the digger begins at the left-hand side with his face to the trench. At a distance of 4 to 5 inches from the face of the trench, by the right foot placed on the right shoulder of the spade and the weight of the body on the handle, the tool is pressed into the earth until the foot touches the surface. By a firm backward pressure of the left hand on the handle the earth is brought forward, and the right hand at the same moment slipping downwards seizes the handle near the base. The earth is raised and *completely inverted* on the opposite face of the trench. The process is then repeated until the line is finished, when the digger repeats the process in the inverse direction. Digging is hard manual labour; but it is the most thorough of all systems of tillage, the returns from land dug being very much greater than any other system of stirring the soil.

No. 31.—*Pruning Saw.*—A variety of saw with a thin blade strengthened by a bow and tightened by a screw. It is easy to work and strong.

No. 32.—*Axes.*—Two sizes of axes at least are necessary in a garden. Western axes are usually made of cast steel, and must be sharpened by grinding. Eastern axes are made of forged steel, and are sharpened by the blacksmith heating the axe, beating its edge fine, and then grinding it. The same process would destroy a Western axe, and garden workmen need to be specially warned about this.

No. 33.—*Seed Box.*—A tin box to preserve seeds from rats and damp, the need of which is obvious.

No. 34.—*Herbarium.*—It is not very probable that the gardener can remember the names of all the plants he has to deal with, yet it is necessary for him to be able to find the name easily. For this purpose a complete set of specimens of all the cultivated plants and weeds which spring up in the garden should be dried by pressure between absorbent paper, and when thoroughly dried, duplicate sets should be prepared, numbered alike, and glued to stout paper. The specimens should be complete with root, stem, leaves, flowers, and fruit, if possible; at least leafy branches from different parts of the tree with flowers and fruit are necessary. A convenient size of paper is 16 × 10 inches. For a small local herbarium it is advisable to have the sheets arranged in books with stout covers. One set of the specimens should be submitted to the Superintendent of the nearest botanical garden for dentification.

No. 35.—*Verging Shears*—For clipping the grass which overhangs the edge of a grass border at the side of a footpath.

No. 36.—*Diary.*—This book is extremely important to the gardener. It should be a perpetual diary ; foolscap size is convenient ; each day should have about one-third of a page. As the diary is intended to last many years, the binding and paper should be strong. In the diary the gardener will note that on such a day he sowed certain seeds, transplanted particular trees, and grafted, formed, or otherwise dressed a portion of his charge. The state of the weather at the time should also be noted, and the result of the operation entered whenever practicable. Any plant noticed in flower for the first time during that year and other incidents which may appear of little importance at the time should be noted down, as they often become of great value later.

No. 37.—*Pruning Shears or Secateur*,—A very strong and convenient tool for use with one hand. It is wonderful with what ease a thick branch can be lopped off with this instrument. In a careful hand it is very durable. Like all other cutting instruments having a pair of blades, it is necessary to keep the *blades at right angles to the branch to be cut.* If this is neglected, the instrument is easily injured. Two patterns, about equally good, are shown, which are sold at about Rs. 3 to Rs. 3½.

No. 38.—*The Pruning Knife or Grafting Knife*—Is strong and of the best steel : the handle is slightly curved to improve the grip and the blade is straight. The best of all pruning work is done with such an instrument. The wounds it makes being clean and smooth, heal rapidly and leave a very small scar. A very keen edge must be kept on this knife, and if by a good maker it will keep the edge a considerable time. The cost of such a knife is about Rs. 2. A "hone" or sharpening stone is a necessary accompaniment to a good knife. A cost of 4 annas will procure a useful one.

No. 39.—*Budding Knife.*—This knife is a delicate instrument: the blade is of the finest steel ground to a fine edge on the point, so that it may cut the bark of a plant while held vertically. Its handle is of ivory, reduced to an edge or to an edge and point at the end, in order to assist in raising the bark in the operation of budding. Practical men who do a great quantity of budding prefer the white-handled form, but some like a combination tool, and to such the two-bladed form is useful; the extra blade may be used for preparing cuttings or similar light work.

No. 40.—*Books.*—A gardener must be a *reading* and *thinking* man. The variety of conditions he meets with is so great and the range of sciences bearing on his work so extensive that without constant reference to the aid of experts in those sciences he becomes a mere worker in a circle, who cannot advance beyond the limited degree taught him in his youth, or who blindly follows the example of his neighbours: hence a library is almost as necessary to a gardener as the tools he digs with.

Of recent publications of a general application, Nicholson's Dictionary of Gardening, published by L. Upcott Gill, London, is decidedly the best. The various departments are written by men of the first place, and the illustrations are very numerous and perfect. And the *Gardeners' Chronicle* a London weekly publication, has stood well to the front during many years as an exponent of the science and art o horticulture.

No. 41.—*Iron Basket or "Gumela."*—The peculiar habi of carrying on the head, which is so general througho

East, makes this indispensable in an Indian garden. The price of the best quality is about 8 annas.

No. 42.—*Mallet.*—Some of our soils are so extremely stiff that nothing short of a heavy mallet will break them down after being dried by the sun. The mallet may be of babul wood and the edges should be rounded, so that fraying may not prevent efficient action.

No. 43.—*Crow-bar.*—In fixing fences and many other kinds of work the crow-bar is indispensable.

No. 44.—*Oil-can.*—A good oil-can filled with cocoanut oil is necessary where a mowing machine is used. The pattern illustrated has a spring, which causes a supply of oil to come out quickly and saves much time. The cost is Rs. 1½.

No. 45.—*Measuring Chain.*—Of 100 links, each 7.92 inches, in all 66 feet, is necessary for measuring land, 10 square chains or 100,000 square links = 1 acre. A measuring tape for small measurements is also desirable.

No. 46.—*Augur.*—1 inch, for boring holes in tubs.

No. 47.—*Steel yard for weighing heavy goods.*—If weighing is not of daily necessity, this is one of the most convenient and portable instruments known. For small quantities of seed ordinary scale and weights are desirable.

No. 48.—*Water Bucket.*—This is in use in the garden several hours daily, and extra weight of metal in the bucket adds greatly to the labour in using it without any compensating advantage. For watering in many circumstances this is better than a watering pot. An ordinary workman uses a light pair carrying 60 lbs. of water with ease. The price is about 12 annas each.

No. 49.—*Pick.*—This is the chief instrument for stirring the of su[illegible] in many Indian gardens. It should be entirely of good steel, and if one end is sharpened and tempered like an axe, it is useful for cutting roots of trees that may be met with while digging. It is then a *Grubbing Axe.*

No. 50.—*Sieves* of three sizes should be provided :

1 inch mesh for potting soil.
½ ,, ,, ,, crushed bones.
¼ ,, ,, ,, sand.

No. 51.—*Stamps for making Labels.*—Durable labels may be prepared by stamping with a steel die numbers on small thin discs of copper, such as may be obtained at the rate of 12 for one anna. A small hole in the disc with a copper or lead wire to fix it to the plant, and an entry in the garden diary corresponding with the numbers, completes as reliable an arrangement as is practicable.

The wire and label should be small enough not to tempt cupidity, and should be affixed to a small branch near to the stem, so that if it is neglected and becomes tight it will not do serious injury. A set of nine stamps cost Rs. 2 at Poona.

The garden line, a stout cord mounted on a convenient reel, is in daily use where neat edgings are kept.

A cabinet with drawers is very convenient for keeping small tools.

Seed jars are necessary. The large jars in which sulphuric acid is imported are excellent for this purpose—the mouth is wide and the cover fits tightly.

PROPAGATION.

SEED-SOWING.

SEEDS require a light rich soil to germinate in, and are very easily injured by an excess of manure or water. Alluvial soil, such as is formed on the banks of rivers by floods, which bring down decayed leaves and fine soil from the hills, generally contain the required constituents in proper proportions, though sometimes it is too retentive of water and apt to cake on the surface. In this case a slight addition of sand or broken bricks brings it to a proper consistency.

A good soil for seeds may be prepared by mixing well rotted leaves and sand and ordinary soil from the surface of a plot in equal proportions. If sand is not procurable, broken bricks are an excellent substitute; but very often neither sand nor decayed leaves are procurable. In this case the half-burned bricks that are so plentiful in the neighbourhood of most cantonments, broken into a coarse powder and soaked in stagnant ditch water, or the fine siftings of charcoal that are to be bought in every bazaar, treated in the same way, form an excellent manure for mixing with any common soil for seed-sowing.

The great majority of seeds require a period of rest after ripening before being sown for fresh growth, but some germinate freely when just gathered as well as later, and a considerable number will only germinate if quite fresh. It may be of use to note a few seeds of this peculiar habit that occur commonly in Indian gardens.

List of Seeds common in Gardens in India which retain the germinating power only a short time.

Ægle Marmelos	Bael.
Allium sativum[*]	Onion, Piaz.
Anacardium occidentale	Caju.
Anona squamosa	Custard apple.
Artocarpus integrifolia	Phunnus.
Azadirachta Indica	Neem.
Bambusa species	Bamboo.
Carissa carandas	Kuronda.
Citrus species	Orange, Lime, Citron, Pommelo.
Coffea Arabica	Coffee.
Cordia sebestana	
Feronia elephantana	Elephant apple.
Gardenia lucida	Dikamallee.
Guatteria longifolia	Asaphula.
Jambosa vulgaris	Roseapple.
Jambosa Alba	
Johnsia Asoka (Saraca Indica)	Asok.
Mangifera Indica	Mango.
Melia Azadirachta	Bukan.
Murraya Kœniga	Currie neem.
Myrtus communis	Myrtle.
Nephalium litchi	Litchee.
Psidium pyriferum	Guava.
Saraca Indica	Asok.
Shorea robusta	Sal.

[*] This seed retains germinating power one year if properly dried and stored where free from atmospherie changes.

Special peculiarities of certain seeds with regard to germination.

Many seeds are furnished with a hard covering, which prevents moisture from reaching the seeds, and consequently retards germination : for example, the seeds of Babul *(Acacia Arabica)*, Teak *(Tectona grandis)*, and of the varieties of Canna are of this nature. In such cases mix the seed in a pot with cowdung and water and leave until the seed has softened and begun to swell, or, if practicable, rub the seed on a file or sandstone until a thin spot appears on the seed. Another plan is to mix in a bottle with sharp sand and shake until the hard silicous covering of the seed is worn thin and then sow. Other seeds, such as Petunia, Begonia, Gloxinea, Mimulus, Tobacco, &c., are very small and apt to be destroyed while germinating by a shower from a rudely handled watering pot. In this case let the soil have a thorough watering before sowing and keep the seed pots in a moist place. By this means the seed will probably be germinated before another watering is required.

Seeds which are imported in tins are generally specially dried before being packed. Peas treated in this way often need to be soaked in warm water for about 12 hours before sowing—the water should not be hotter than the hand can bear. A safe way is to place the seeds in an iron basket (gumela) with cold water, invert a second gumela over the first, and expose them to the sun. By this means a safe degree of heat is obtained easily.

When a seed tin is opened, if the paper containing the seeds is damp, the seeds will probably be in an excited condition and will germinate very soon if sown at once. If such excited seeds are exposed to the air and kept a few months the vital principle will be greatly weakened or entirely lost.

This is the chief disadvantage in purchasing imported tins of seeds. A part of the seeds in a tin are wanted for June or July sowing and a part is wanted for sowing in September or October. If the tin is opened at one season, the seeds required for the other season are sacrificed.

IN DEALING WITH EUROPEAN SEEDS

The safest plan is to leave the seeds in the care of the seed merchant at home and order such kinds as are wanted at particular seasons to be sent in time for those seasons only. Some of our local seed merchants understand this matter so well that they have adopted the plan of importing seeds monthly.

DEPTH SEEDS SHOULD BE SOWN.

It is a very good rule to cover seeds with soil about equal to the circumference of the seed itself; but this rule must be used with judgment: it is not advisable to put any seed more than four inches deep in the soil.

Great care should be taken in watering seeds not to dislodge the soil or the seed so that its axis of growth may be altered. The seed-bed or pot should be shaded from the midday sun, but allowed a full share of light, as the tender seedlings grow rapidly and are easily injured by being drawn up weakly when light is deficient.

Seed-beds and pots should be protected from heavy rain, as the surface of the soil becomes caked, so that seedlings have great difficulty in forcing their way through, and the seed is often condemned as bad, from the fault of the cultivator.

It is advisable to mix very small seeds with some fine earth before sowing to secure equal distribution.

CUTTINGS.

In propagating by cuttings in this country most success will be met with by taking cuttings of well ripened shoots. These should be about three joints in length, cut close beneath a bud, and inserted about one-third of their length in fine sandy soil or brick dust. Very delicate cuttings, such as those of *Poivrea coccinia* and *Bougainvillea spectabilis,* should be planted in pots prepared as follows :—

PREPARATION OF POTS FOR CUTTINGS.

First potsherds should be placed at the bottom of the pot, arranged carefully so as to secure thorough drainage, then a layer of moss, if it can be procured; if not, cocoanut fibre—matting teased out will answer. On the top of this, place the mixture of leaf mould and sand; let it come up to within two inches of the rim of the pot, and then add one and a half inch of sand or brickdust. The cuttings should be inserted in the top layer, barely touching the second one, so as to reduce the danger of rotting and have food ready for the young roots as soon as they appear. The whole should then be kept in a glass case or covered with a *bell glass*—one of the globe lamps that are so common in this country answers this purpose very well.

SEASON FOR CUTTINGS.

For cuttings the months of September, October, and November are generally the most favourable. The essential point in striking cuttings is to prevent evaporation from the surface of the cutting as much as possible until it has taken root and is able to replenish the sap that is dried up by the heat of the sun. With this view cuttings should be protected from bright sun and hot winds as much as possible. In watering cuttings an equable state of moisture should be aimed at; therefore the water should be given often and in small quantities.

SELECTION OF CUTTINGS.

As a general rule branches which are well ripened and are taken from branches near the ground at a joint, *i.e.*,.where one branch joins another, will be the most successful cutting; but some delicate hard-wooded plants, such as Poivrea Combretum, Arbutus, and Euonymus strike root more freely from half-ripened wood, and many soft-wooded plants, such as the

Dahlia, which are difficult to propagate in ordinary circumstances, strike root freely in BOTTOM-HEAT, which see.

ROOT CUTTINGS.

Underground ramifications, commonly called roots, but in reality portions of the stem, often are used for propagation with great success. Species of Clerodendron, Millingtonia hortensis, Cæphalis Ipecacuanha, the Potato, and many other plants may be propagated in this way. If the plant sends up abundant shoots from the base, root cuttings may be tried with a probability of success.

TO PREPARE A FRAME FOR BOTTOM-HEAT

Select a good garden frame and dig a hole in the ground three feet deep and one foot longer and wider than the frame. Fill the hole with a mixture of one part stable dung with its litter, one part dead leaves, and one part fine soil. Water and incorporate the mixture thoroughly, then fill the hole, gradually treading gently and equally as filling progresses. Fit on the frame, and place a layer of four inches of fine sandy soil on the hot-bed prepared. Fermentation will raise heat; and if the warmth is not greater than is agreeable to the hand when thrust into the mass, the cuttings may be inserted.

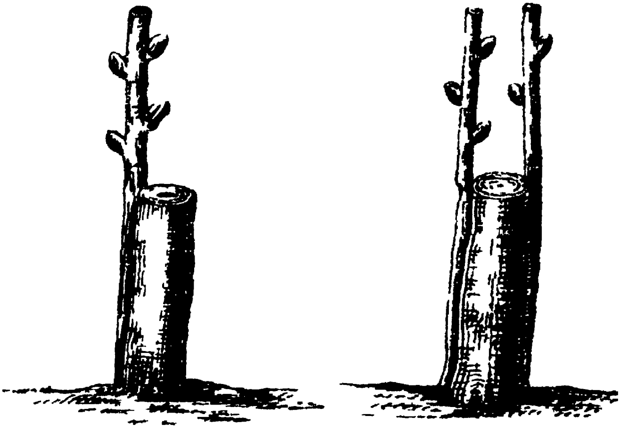
In an arrangement of this kind soft-wood plants generally strike root freely, and seeds otherwise difficult to germinate sprout freely.

Cuttings rooted with bottom-heat must be early removed to a cool frame, and seeds should be removed as soon as germination is complete; otherwise growth goes on more rapidly than is desirable.

GARDEN FRAME.

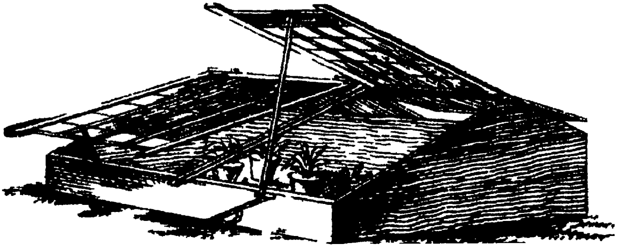
A figure of the garden frame is given, which is more effectual than any description in showing its construction. The

FIG 8 FIG. 9



Crown or Rind-grafting

FIG 10



Three-quarter Span roof Frame.

material should be of the best quality of teak, carefully fitted and thoroughly soaked with linseed oil. Such a frame will last many years. Its size should not be greater than two men can lift. If two "lights," *i.e.*, frames containing the glass or windows, are used, 5 feet in length by 4 feet in breath is a convenient size to be worked by the mallees of this country. The "lights" will then be 4 feet in length and 2½ in breadth, as the greater the area covered the more equal the temperature and humidity. A number of frames may be placed side by side with advantage.

Such frames must never be exposed to the sun because the sun's rays can pass inwards through the glass, but are reflected so feebly that they cannot pass out again, and the result is a degree of heat that will destroy rather than propagate plants.

As a temporary mat or other covering is apt to be blown off or neglected some time or other, the garden frame should be under a trellise, which is fixed so as to break the sun's rays, but admit light freely.

Ventilation must be carefully attended to; and as cuttings need less ventilation than rooted plants, it is desirable to have more than one frame, so that different degrees of ventilation and heat may be maintained. Some plants may be propagated by cuttings made from leaves. This reminds us that the leaves and the stem are modifications of one body, and that all the different organs of the plant, the root, the stem, and the leaves, and the calyx corolla stamens and pistil of the flower are all evolved from one bioplasmic mass and frequently exhibit retrogressive change as occurs in double flowers when the stamens are converted into petals giving a more showy flower, but one less capable of the work for which it was evolved, the production of seed. Plants which are easily propagated from leaves are *Begonia*, *Gesnera*, *Achimines*, *Gloxinea*, *Cyrtandra*, *Aloe,* and *Bryophyllum, Cotyledon,* and other members of the natural order *Crassulaceæ.*

THE RATIONALE OF GRAFTING.

In trees and other plants which have broad leaves with the veins forming an irregular network, such as the *rose, mango, banyan,* and *orange, but excluding the banana* (kela), *sugarcane, and* ahloo (*alocasia*). At certain seasons of the year, when the sap is moving, the bark is easily separated from the wood, because between the wood and the bark a layer of cells in process of growth exists, called cambium, which completely envelopes the plant beneath the bark.

THE CAUSE OF THIS ENVELOPMENT IS,

Such trees are formed of wedge-shaped bundles of fibres and vessels (fibro-vascular bundles) arranged vertically, the thicker portion of the wedge being the bark. The bundles extend from the outside of the bark towards the centre of the tree. At a point near to the outer edge, each bundle is provided with a layer of cells, which at certain seasons is in process of active growth. The coincidence of this layer of cells in all the fibro-vascular bundles forms the enveloping layer (cambium), which separates the wood from the bark.

If two plants which are closely related and have sap of a similar kind, such as two kinds of mango or two kinds of rose, have this layer of cambium exposed by cuts from a sharp knife and the cut surfaces are fastened close together: air and water being kept out as well as practicable, the surfaces will both exude freshly formed cells from the cambium, and those cells being similar in constitution will combine and form one tissue which will harden into wood.

In plants having narrow leaves with the veins running parallel, such as the *banana,* the *sugarcane,* the *cocoanut* *tree* (*Monocotyledons*), the form and arrangement of the fibro-vascular bundles differs much from that described above. In this group of plants the fibro-vascular bundles are short-lived and like wires in form, and the cambium portion of each bundle does not come to the outside, so that if we cut a portion of the stem, instead of two clear lines of cambium we expose only minute specks of that formative tissue, and to bring those specks of cambium into contact sufficiently to form a graft has not yet been accomplished. Therefore the stories we are told about grafting different kinds of bananas together and thereby producing a crossbred fruit may be consigned to the limbo of fable.

> "I took his brush and blotted out the bird,
> And made instead a gardener putting in a graft,
> With this for motto—'Rather use than fame.'"
>
> TENNYSON.
>
> *Merlin.*

OBJECT OF GRAFTING.

It appears that the object of grafting is not generally understood, and may be explained here.

All plants that spring from seed vary in particular qualities to an infinite degree. The variations, in the particular part of the plant which man requires, may have been restrained in plants which have been long in cultivation, such as wheat or rice, to such an extent that the seeds of a particular variety of wheat or rice are comparatively uniform, and on sowing such seeds like produce rises. This is the effect of selection and hereditary influence, but in the case of fruit trees which often require many years to yield seed this process of selection is not practicable, and we find that, for example, if the seeds of an Alphonse Mango are planted the fruit produced by the trees raised from that seed will vary to a great extent: probably one in a thousand will possess the desirable qualities of the parent tree, the others will vary much, and by far the larger proportion will bear ordinary fruit full of strings and of a turpentine flavour. The mangoes sold as Alphonse, Pirie, and other famous names are the produce of trees of which the stem is actually a portion of some select tree grafted to common seedling mango plants. Sowing mango seeds in the hope of obtaining superior varieties is desirable, and the prospects will be greatly improved if the pollen of one superior kind is applied to the stigma of another good sort and cross fertilization secured.

FIG. 1

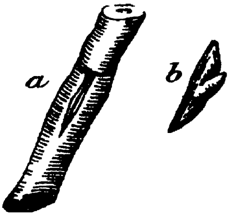


FIG 2

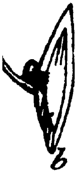


FIG. 3.

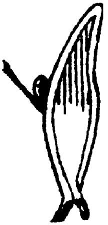
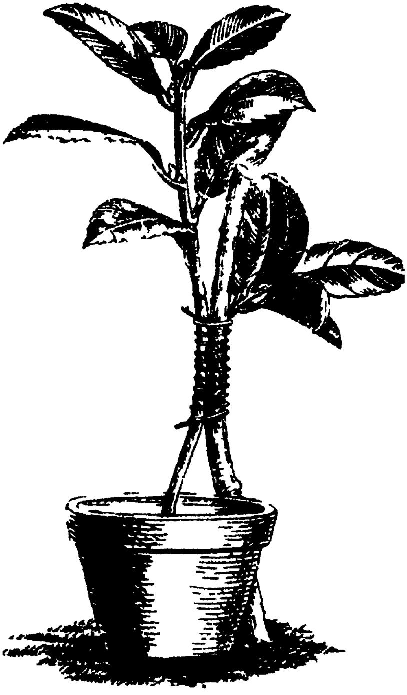


FIG. 4



Grafting by Approach

BUDDING.

Budding is a variety of grafting, and it is a very simple yet delicate operation. It consists of removing a bud from one plant and making it grow on another plant, which must be of the same family and closely related, although it may yield fruit or flowers of an inferior character; for instance, we can bud an orange on a lime tree and a peach on a plum tree, but we cannot bud a rose on an orange tree. In budding, a single bud is cut from the twig of the plant to be propagated; if there is a leaf attached to the bud, the blade of the leaf should be cut off. Then, by inserting the knife about half an inch above the bud and cutting slightly inwards and downwards, bring the knife out about half an inch below the bud. This removes the bud with a small shield of bark attached, and generally a little bit of wood adhering to the centre of the shield. This bit of wood should be removed with the point of the knife, a longitudinal slit, a little longer than the shield of the bark, should then be cut in the bark of the tree to be worked on, and at the upper end of this slit a small transverse slit made to facilitate the raising of the bark, so that the cut is T-shaped. In making this cut care must be taken not to go deeper than the bark. If the wood is cut into, an obstruction is formed, which causes injury; this point is of special importance in budding the orange tree. Then taking hold of the cut corner of the bark with the point of the knife, raise the bark slightly, and inserting the handle of the knife between the bark and the wood, raise the bark on both sides sufficiently to allow the bud and its little shield of bark to be slipped in; then close over the cut edges of the bark and tie with tape or worsted thread or perhaps, better still, because not liable to contract or expand by change of weather, the *sopat* or strip of fibres obtained from the stem of a plantain tree. The proper season for budding is at any time when both the tree which yields the bud (the scion) and the tree which receives it (the stock) are growing freely. That is generally from June till February.

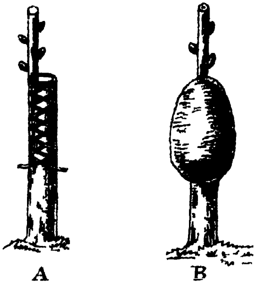
By regular practitioners a peculiar form of knife is used for budding. It has a blade which is sharpened at the point from the edge to the back of the blade, so as to cut with the end of the blade when making the slits in the bark of the stock, and a handle of bone or ivory, very thin at the end, to raise the bark with. If such a knife is not at hand, a sharp penknife and a small paper-cutter make good substitutes, see No. 39 in illustration.

In budding the orange on to the citron stock it is not necessary or advisable to make the cross slit. By bending the stock slightly towards the cut, the edges of the vertical cut may be raised and the bud slipped into its place with very little trouble The best season is *during the rains, when the plant is growing freely.*

GRAFTING

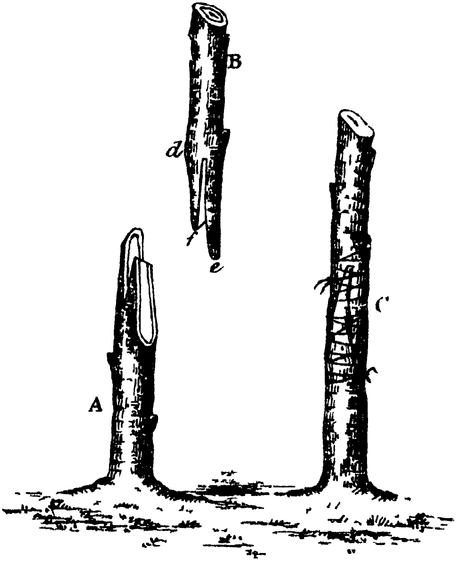
Consists of causing a twig of one tree to adhere to, and grow on, another that is closely related to it. The essential part is to cut the scion and stock so that the inner bark of both may be brought together, because it is at this point that union takes place. The proper season for grafting is immediately before fresh growth takes place. Now, as many trees in this country have two growing seasons, a rainy season and a hot season growth, it is preferable to graft near the middle of the rains; but this question can only be answered decisively on examination of the individual tree to be worked upon. The scion must be of firm, well-ripened wood, with dormant but plump buds, and the stock must be ready to start into growth: this condition may be known by the buds swelling. The most generally useful form of graft is that known as the tongue graft;

FIG 11



of Tying and Claying

FIG 12



Whip or Tongue-grafting

it is made as follows:—If your stock and scion are nearly the same size, cut off the head of the stock; then cut it down near the centre for about one inch or more in proportion to its size; take a slice from the outside of one of the halves, working the knife gradually inwards so as to leave the tongue with the end as thin as possible; make exactly the same cuts on the scion, and the two parts should then fit together accurately, and must immediately be bound together with *sopat* or tape and the union covered with well tempered clay or grafting wax. The plants must then be kept in a frame heated slightly by a layer 18 inches deep of cowdung and leaves mixed in equal proportions.

INARCHING

Is bringing two living trees together and causing a union by cutting a portion of the wood and bark from each, so that the inner bark of both can be made to touch accurately; the two wounded surfaces are then tied together and clay applied to keep out air. This operation can be performed at any season, but is most successful when the trees are in vigorous growth. It is by this means that the famous Mazagon mangoes are chiefly propagated.

This operation is extremely easy, very little skill being necessary. It is usually performed between a large tree of a superior variety growing in the ground and a small seedling of the same species growing in a pot. The plant in a pot may be elevated to the branch of the large tree by tying it to a thick branch, or a stage may be erected on which a large number of pots may be arranged. Some of the grafting stages at Gunesh Khind had 500 plants in pots enarched to one tree. The only difficulty is to see that the plants in pots are *regularly watered*, the soil *must be kept moist*, and from the position the pots are apt to be neglected.

GRAFTING THE MANGO.

Healthy seedling mango trees with stems from 3 inches to 1 foot diameter may be grafted during the month of December* by a system known as crown-grafting, which is done as follows :—The head of the seedling mango tree is cut square off, about eighteen inches from the ground during the month of November, in order to give the stump time to recover from the severe blow given to the tree by removing suddenly all the leaves and withdrawing a part of the force employed in causing the sap to rise. The effect of cutting the head off a tree varies much with the season. To perform the amputation, a month before the graft is to be applied affords time for the rectification of any disturbance of the flow of sap which may have taken place. A few inches more should be taken off the stump at the time the graft is applied, in order to get a clean wound. A slit having been made right through the bark, six inches long from the top of the decapitated stock, the handle of the grafting knife, which has the end sharp and is slightly wedge-shaped, or the point of a smooth horn is then inserted between the bark and the wood at the end of the slit. This causes the bark to rise and leave an open space between the bark and the wood. Into this space the "scion," as the branch of the fine sort of mango to be propagated is called, is inserted, being first cut into the form of a paper-knife or of a table-knife with a thick blade. It should be flat on the side to go next the centre of the tree, and slightly rounded on the other side: the centre of the blade should be made to coincide with the slit in the bark. The whole is then bound tightly with a string and covered with grafting clay. Expert operators may put in several scions on one stock, but the work must be done quickly.

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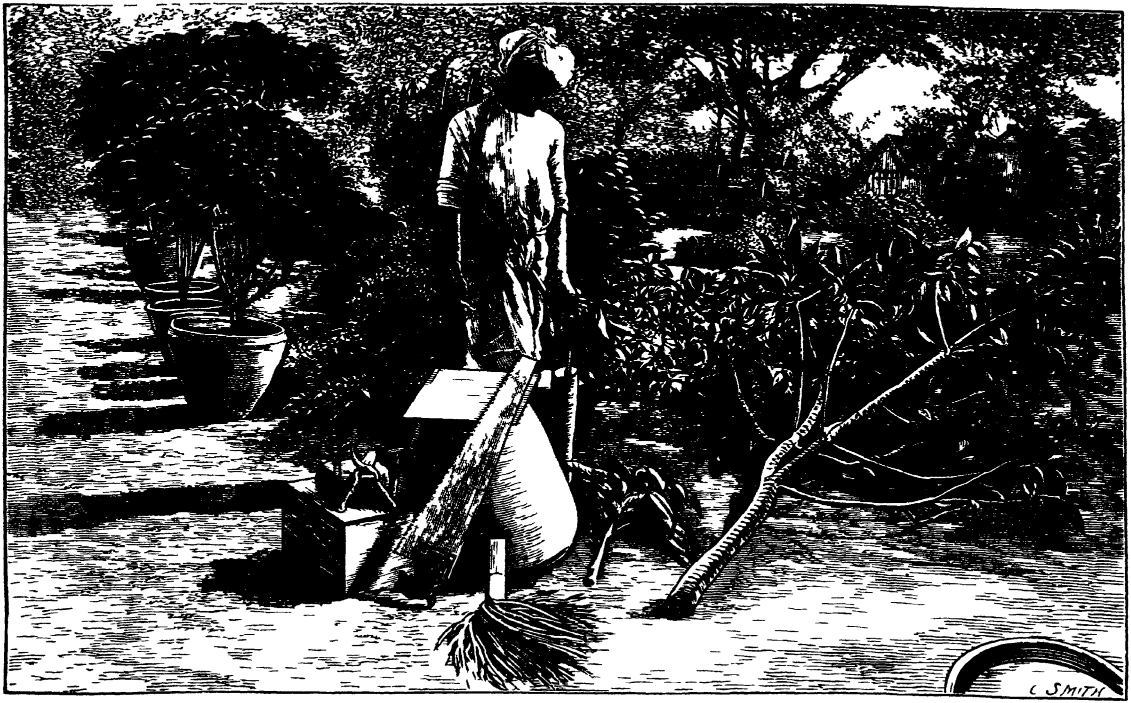
* NOTE.—See remarks under "Graft Protector."



GRAFTING THE MANGO

EXPLANATION OF THE ENGRAVING.

GRAFTING THE MANGO.

THE art of grafting is by no means new in India. Inarching is very common and true grafting is regularly practised by people in the districts near Rutnagherry and Goa, but a knowledge of the art is held by much fewer than is desirable for the good of the country. Immense numbers of seedling fruit trees in a semi-wild state occur on roadsides and in hedgerows, bearing fruit of the meanest possible quality. That it is practicable to graft those trees if not more than one foot in diameter, and in a short time convert them into trees bearing fruit of a high class, I distinctly affirm. The process employed is shown in the engraving, which may be described thus. The grafter is Guja Bapoo of Aund, near Poona, one of my pupils in grafting, who has taught many of his fellow-countrymen. He has cut down a seedling mango tree about four inches in thickness with the saw. This tree is technically called the *stock*. With the strong pair of scissors shown in the engraving, the *secateur*, he has cut a well ripened shoot of the previous year's growth about ¾ inch in thickness from a valuable mango tree. This branch, which is technically called the *scion*, has by the grafting knife a part pared away from two sides until there is a regular diminution from a point about six inches from the lower end downwards, the least thickness being about ⅛ inch. The side of the scion to be placed next the wood should be plane and the outer side rounded slightly. In experienced hands the plane side may be at once reduced to the desired thickness, leaving a shoulder: this makes neater work, but is more difficult and not essential. A slit through the bark is made with the grafting knife, as long as the prepared part of the scion.

A smooth horn or bone, in shape like a dagger, is then inserted at the top of the slit pressed downwards gently and the bark raised. (If the stock of tooth brushes in a shop is looked through, one may be found with a handle which looks as if made on purpose for this work.) The scion is then inserted, pressed firmly into its place and tied first with a strip of fibre from the stem of a banana plant and above that by strong twine. In the case of a large tree with thick bark considerable force should be used in tying the graft. It is then covered carefully with grafting wax or well kneaded clay, and covered by the GRAFT PROTECTOR—a simple contrivance which occurred to me in 1885. I believe it renders the making a true graft practicable throughout India as well as in the moist maritime districts of Goa and Rutnagherry. The Graft Protector is a large pot with a hole six inches square in the bottom which is inverted over the newly formed graft, a sheet of glass is luted on the hole, and a shade of green branches erected so as to keep the sun's rays from the sides of the pot. An open part of the shade should be left on the northern side to admit light and the graft watered on the outside of the pot three times daily. After the first three weeks the glass should be removed entirely during cloudy moist days and on bright days from sunset till the sun is well up next day. Attention and commonsense are at all times necessary to keep the delicate graft alive during the first month in the trying climate of the dry parts of India, but the requisite attention is not too much for one man to attend to 100 grafts easily. The proper season for the work is an important matter. It is *that season when by the swelling of buds and the appearance of new leaves a fresh flush of growth is expected.* The time of year at which this may be expected depends much on local conditions and the weather. At Poona I have been successful in July, August, November, December, and January; at Belgaum in November; but only one trial was made at the latter station, and I doubt not these months are suitable for the majority of stations in India.

As it is important that the operation described above should be carried out quickly, it is advisable to read the chapter on the RATIONALE OF GRAFTING carefully, and practise the preparation of scions and the other operations on any common trees before operating on valuable stocks.

In crown-grafting the mango, the most important point is to take the trees at the proper season, that is, when a fresh rush of sap is passing to make new growth. The middle of December is the time generally suitable in this district, but the trees should be watched, and as soon as the buds are seen to be swelling the graft should be made. It is advisable to begin about two feet from the ground, because then, if the work is not satisfactory, another six inches may be taken off; and if a second failure is made, the operation can be repeated still lower. When the graft is finished a shade of green branches or grass should be erected to keep the scion fresh. Or arrange a

GRAFT PROTECTOR.

An efficient protection for a newly grafted tree may be made as follows:—Take a large flower pot, make a hole about six inches square in the bottom, invert the pot over the graft, place a luting of clay, around the hole, press down a sheet of glass on the clay, and arrange a shade of leafy branches to keep the direct rays of the sun from the pot, and sprinkle water on the shade daily. The graft being surrounded by cool moist air will keep alive longer than if exposed and the probability of success is greatly increased. Recent experience with this simple device has greatly increased my opinion of its value. By its use the grafting season for the mango is extended from June to January.

GRAFTING CLAY.

An excellent mixture for covering grafts and other wounds on plants is one part of bullock-dung and two parts of fine soil, carefully kneaded together with a little water. Almost any kind of earth, except black earth, is suitable for making this mixture. Black earth cracks too much in drying; the best is the kind used by the people to smear the walls and floors of their houses.

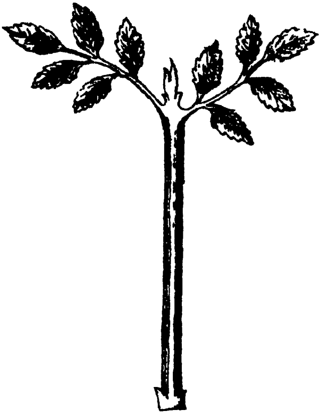
GRAFTING WAX.

A wax that the author has lately found to be specially adapted to this climate and easily prepared is that composed of equal parts by weight of rosin, bees'-wax, lard, and turpentine melted together over a slow fire. When required for use the wax should be heated by a water-bath in the manner glue is heated, and applied to the graft by a little brush. When used, the wax should not be hotter than the hand can bear.

PROPAGATION BY LAYERING.

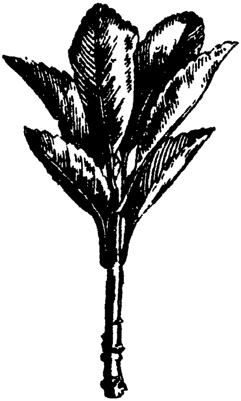
Layering is an operation by which a portion of a plant is made to give roots, so that it can ultimately be cut off and treated as an ordinary plant. If the branch to be layered can be brought down to the ground, a slit should be cut at the firmest part that can be made to touch the ground by inserting the knife at the lower side near to and beyond a bud, and cutting nearly to the centre of the branch, drawing the knife towards the end of the branch about an inch or more. A small stone should be placed in the slit, and the cut portion covered with sand or powdered bricks. A good-sized stone should then be put on the part to keep all steady, and water supplied regularly as the soil gets dry. It is obvious that in many cases where the branch cannot be brought down to the soil, the soil may be taken to the branch, either by fixing a potful of soil on a stage or by tying the soil round the branch with sackcloth. In this case it is advisable to suspend a small *chatty*, from which water may drip so as to keep the soil moist. In layering the Allamanda and sorts of Ixora that have numerous branches, shallow pots may be used, and one pot piled on another, each having one or more layers ; the top pot may have a stone in it, and be used to receive the water.

FIG. 5.



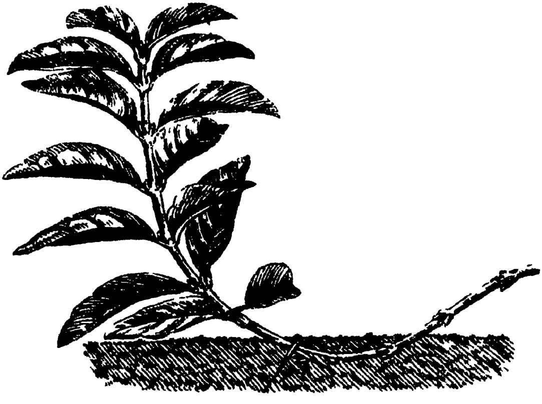
Soft-wooded Cutting prepared for Inserting

FIG. 6.



Hard-wooded Cutting. Euonymus Japonicus

FIG 7.



Layering by Tongueing or Heeling

PRUNING

Is the art of removing certain portions of plants with a view to symmetry or the production of more and superior fruits or flowers. It consists of two distinct operations—the cutting out of branches that have reached a considerable size and the removal of the points of growing shoots. The first operation should be performed only when the tree has nearly finished its growth for the season, because at this time the sap is not rushing upwards so rapidly as it is at other times, and the wound heals rapidly. If a branch is cut off a short time before the tree begins to grow, probably a large quantity of sap will escape at the still fresh wound, and the tree will be greatly weakened by the loss. This is technically called bleeding. The second operation, cutting out the points of growing shoots, may be performed when the plant is in full growth. This system is suitable for keeping herbaceous or soft-wooded plants symmetrical. Of special pruning, notes are made when treating of the plants which require it.

Sharp tools are necessary in pruning because the wound made by a sharp tool heals more quickly than a ragged wound will do. If it is practicable to cut a branch with a pruning knife, the result is better than any kind of shears produces. A saw with an extra thick blade or a thin blade strengthened by a frame is suitable, but the wound made by a saw should be dressed at the edges with a pruning knife.

TRANSPLANTING.

For successful transplanting the essential conditions are that the exhalation of moisture from the leaves be kept as low as possible while the roots are in a condition unfit to furnish their usual supply; for this reason, if trees are of a deciduous character, they may be transplanted with most safety when the leaves have fallen. Exhalation of moisture from the leaves of plants goes on most rapidly when the atmosphere is dry and the sky cloudless; therefore, for plants in foliage, if the transplanting cannot be done in moist cloudy weather, these conditions should be secured by shade and frequent sprinkling with water. If possible, all plants should be transplanted with a mass of soil about the roots, which should be disturbed as little as possible; but some plants which have large woody roots and few fibrous roots near the stem, such as rose trees that have been growing for a number of years in the same place, it is of little use lifting a ball of soil with the plant ; it should be dug out carefully, keeping the roots as entire as possible, carried to its new site, where the hole should have been prepared at least twice as large as the roots require. When the tree is placed in the hole it is of importance that the roots be kept in their natural positions and not twisted or bent in any way. If any roots have been broken, they should be cut off with a sharp knife and the soil carefully placed among the roots, so that all the interstices may be completely filled. As the filling up progresses, the soil should be trodden thoroughly at short intervals, so as to make it very firm throughout the whole mass. The author has transplanted many large trees successfully, and considers the last point of special importance and requiring unremitting attention. When such repeated treading is necessary it is obvious that wet soil is not suited for the purpose.

Manure should never be placed immediately on the roots of a plant; some fine soil should be placed on the roots first, then manure may be put in and covered with soil.

In transplanting trees it is advisable to prune away a number of the smaller branches, and especially any unripe shoots which would probably die in any case. By this means the stomata through which exhalation goes on are diminished and the plant gives up less of its moisture.

If the tree has been growing in a shady place, or if in planting the side that previously was in the shade is turned to the sun, great scars may be made in the bark before the tree puts out sufficient leaves to protect itself. This should be avoided by covering the stem with straw or some other non-conducting material.

TRANSPLANTING LARGE TREES.

It is not often that transplanting large trees is necessary: that is one good reason why notes on the subject are valuable when they result from practical experience, because it is seldom that such experience is acquired. One of the first serious operations the writer was called on to perform was transplanting large trees, which were so very successful as to create surprise and lead to the belief that such operations are much more safe in this country than in Europe.

SEASON.—November and December are favourable months. The rainy season is not recommended for this work, because it is scarcely practicable to keep lately transplanted large trees steady during that season. The hot season also has gales and is otherwise objectionable.

If the tree to be transplanted is tap-rooted, a circular trench, wide enough for the men to work in, must be dug at a distance of two feet from the stem at the surface and gradually approaching the centre as it descends until the "ball" of earth is the shape of an inverted cone. To the sides of the ball of earth thin boards 4 inches wide should be closely arranged and fastened by ropes twisted so as to become very tight.

A TREE-LIFTER must be at hand, consisting of a pair of strong wheels and axle and two strong poles six inches in diameter at the thicker end, and twenty feet long. About four feet from the thick ends those poles should be fastened to the axle, the small ends being tied together firmly.

The lifter is then backed up to the tree, the short ends of the poles fastened to the sides of the ball of earth, the long end depressed, and the tree lifted. The hole is then filled up with earth ; and the tree being placed on the filled in earth, a fresh grip lower down is taken, so that the tree may run free from the ground. If the distance the tree is to be carried is short, it may be kept erect ; but if the distance is considerable and telegraph wires or bridges are to be passed, it is better to let the tree fall gently across the axle, care being taken that sacking or some other protection is given to the bark.

Cypress trees are not tap-rooted, but the roots are fine and wiry ; therefore a ball of earth should invariably be taken with them. Cypress trees thirty feet high are well worth transplanting ; with ordinary skill there is little danger of loss, and the effect produced is great. Trees with spreading roots, such as the Gul Mohr *(Poinciana regia)* and Millingtonia cannot be lifted with a ball. It is better to begin digging round such trees at a distance of four feet and cut clean off all roots that pass that line, remove all the soil, and lift as described above. Drag root first by bullocks, men being stationed to keep the head from rubbing on the ground.

In planting keep the tree in the same position with regard to the sun as it previously had. If the opposite side is turned towards the sun great scars may form on the stem and branches on the side exposed to the sun.

To fill in round the root use moist—*not wet*—soil, and pack it among the roots firmly and carefully. Manuring at this stage is not advisable : water thoroughly at once and keep the soil moist for some months afterwards. Fasten the trees firmly by ropes to prevent swaying by the wind.

PRUNING LARGE TREES WHEN TRANSPLANTING.

When the tree that is being transplanted is brought down on to the lifter cut off all the branches less than one inch in diameter. Such branches would die in any case and a deal of work may be saved by cutting them off at this stage.

It may be noted here that a four-wheeled transplanting machine with powerful screws was tried but found to be no better than the simple arrangement previously described.

LIST OF TREES WHICH MAY BE TRANSPLANTED SAFELY WHEN OF LARGE SIZE.

Acacia arabica	Babool.
Albizzia procera	Kinye.
Albizzia lebbek	Sirus.
Azadirachta indica	Neem.
Bambusa, several species	Bamboo.
Bauhinia variegata	Kunchen.
Bombax Malabarica	Kanta Sciree.
Casuarina muricata	Casurnee.
Citrus, several species	Orange tribe.
Cupressus ,, ,,	Siroo.
Cycas revoluta	Sago tree.
Dalbergia sissoo	Sissoo.
Erythrina indica	Pangara.
Ficus religiosa	Pepal.
Ficus indica	Wad.
Gmelina arborea	Shewan.
Millingtonia Hortensis	Coula neem.
Morus indica	Toot.
Olea ferruginea.	

Olea Sativa	Olive.
Palms, many species.	
Plumieria acuminata	Sone champa.
Poinciana regia	Gul Mohr.

No doubt this list could be greatly extended, but the author has preferred writing only such as he distinctly calls to mind.

COST OF TRANSPLANTING LARGE TREES.

Whether transplanting large trees is profitable or not depends on the time within which the desired effect is wanted. It certainly is costly at first. A tree 30 feet high and weighing 1 ton cannot be transplanted a distance of a mile for less than Rs. 20. Whether this is more than the cost of planting a young tree and attending to it for several years is doubtful, and local conditions must decide whether large or small trees are selected for transplanting. If care and anxiety are to be avoided, small trees certainly should be preferred.

POTTING.

If we take up a properly shaped flower-pot with a plant growing in it, and having inverted it on the hand, give it a smart tap on a bench, the plant with its soil will slip out on the hand : the roots can be examined, the drainage put right, and the pot returned to its place. It is obvious that this cannot be done with the curved-sided pots called coondies that are so commonly in use in this country.

Occasionally properly made pots may be purchased at a greatly enhanced price, showing plainly that the potters can make such pots. If pots with straight sides only are asked for, the misshapen pots will soon disappear from the market.

In most pots the lowest part of the bottom is in the centre, and the drainage hole is made at this point. In large pots it would be advantageous to have a rising in the centre, as is seen in an ordinary glass bottle, and three holes in the sides at the bottom. This would provide thorough drainage, make a stronger pot, and help to prevent worms from making their way into the pots and stopping the drainage.

Now, having provided the best pots obtainable, the first operation is to make the drainage. For this purpose potsherds broken to a convenient size should be arranged with the concave side downwards; on this a coating of some fibrous materials or dry leaves should be placed to prevent the soil from going down; this having been pressed slightly, is ready to receive the soil specially prepared for the plant to be potted.

POTTING SOIL.

As the quantity of earth that a plant in a pot has available is very much less than the same plant would make use of in the open ground, it is very important that soil for potting should have a large quantity of its constituents in a soluble form. On this account, in Europe, soil containing a great quantity of fibrous roots is much preferred for potting, not only because these delicate fibres prove that the soil was in good condition previously, but by the decay of the fibres the soil is brought into a soluble form, thus giving a large supply of plant food in a limited space, and also because the fibre assists to maintain a suitable degree of humidity. The black soil of the Deccan, enriched with manure, is excellent for many garden crops in the open ground. The same soil is quite unsuited for pot culture, because it retains water too much, and contracts and expands to a great extent with the variations of its condition as regards moisture.

To provide suitable potting-soil, get all green weeds pulled up so that plenty of soil will adhere to the roots; mix in a pit with the dry leaves and stable litter in equal parts; keep the mass moist and covered with a coating of soil taken from the surface, and of that degree of fineness that will crumble in the hand if moist instead of making a plastic clay, as a soil with very fine particles will; six months after being buried, this mixture will be fit for potting purposes. Another plan which is not often found pacticable in this country is to take the upper three inches of any soil that carries a close short turf and lay up the soil in a heap for a few months, the sods being laid upside down. If some manure is mixed with the soil while being laid up, it brings the soil into good condition more quickly.

Soil for potting, or indeed for any garden work, should only be taken from the surface, so that it may be certain that the air has acted on it thoroughly.

REPOTTING.

If the roots of plant to be re-potted are closely matted it is advisable to open them out gently with a pointed stick.

If the roots are very fine and wiry the soil in the pot should be put in firmly and carefully packed, leaving a fair space for the supply of water. If the roots are thick and fleshy the soil may be filled in loosely with advantage.

Bulbous and turberous rooted plants may generally be shaken entirely out of the old soil.

In repotting plants with fine fibrous roots it is sometimes found that the old ball is hard and dry. It is better to soak such a ball in water for a day previous to repotting because the dry ball may resist the water so that the new soil may be soaking with water while the old soil is very dry.

NOXIOUS INSECTS AND GARDEN PESTS.

An interesting and useful observation on the habits of insects has been made by Dr. T. Cooke, Principal of the College of Science, Poona.

That gentleman grew radishes and other kinds of salad in boxes on the upper flat of his residence, and observed that insects did not attack the plants grown in that place, while similar plants were being destroyed by insects in his garden.

The cause of this may be that the locomotive power of many of the insects that commit serious injury is limited; and the distance from the nearest plants infested by destructive insects in this case was sufficient to prevent attacks, and permitted young plants of cauliflower, cabbage, radish, and other plants of the same family to be reared at a season when such could not be grown with ordinary care in the garden.

The practical application of the fact noted may enable the residents of some stations to enjoy a supply of vegetables much earlier than is done at present. In some instances flat roofs of houses may be available; in others a portion of the garden may be covered with a thick coating of dead leaves and brushwood, which, if burned, would destroy the eggs of insects within reach of the fire. In the middle of this prepared plot, tender seedlings would certainly be more safe from injury than in the midst of plants infested by insect pests.

COCCINELLA (LADY-BIRDS).

Small red beetles with black spots which abound in July and August are considered by the mallees very destructive to the cucumber and cabbage tribe, but are not injurious to plants. Lady-birds are the mallees' friends because they feed on *Aphides*, very small flies of a great variety of colour, but in many cases green and called green-fly by English gardeners.

LOCUSTS—GRYLLUS MIGRATORIUS,

If flying may be kept off by burning a smouldering fire of tar and green twigs of the milk-bush to windward of the plantation to be protected; but if on the ground, a deep trench should be dug across their path and kept filled with burning straw—the insects will drop into the trench. Solitary insects of the locust tribe often do great damage to the leaves of Dracænas and other plants in conservatories; these should be caught by the hand.

WHITE-ANTS—TERMITES

Do considerable mischief by eating the stakes used to train plants. Soaking the stakes in hot tar as far as they are intended to go into the ground will prevent their attacks. This plan is better than applying the tar with a brush, as if a little crevice is left the ants will find it and get underneath the coating of tar. As the ant-hills are unsightly in a garden they should be dug out until the queen ant is found. Sometimes, if the hill is large, several queens may be found. If the ground is dug over frequently, there is little danger of their settling again. Ant-hill soil is a very good manure.

The above was written several years ago, and is still my practice where I cannot get irrigation water; but a much simpler method occurred to me a year ago, and has proved thoroughly effectual. It is this: level down the ant-hill to a few inches below the surface of the ground, spread the soil about, and turn the irrigation water on to the site of the ant-hill; let the place be well flooded three days in succession, and the colony of ants will disappear. Mr. Henry says—"Calotropis leaves chopped up small and put into the nests before flooding will destroy the ants and prevent others from coming." This would be advisable when water is scarce.

SCALE—COCCIDÆ SPECIES.

Under this name are included several species of insects that adhere to the bark of trees or to the under sides of leaves. They in some degree resemble small shells adhering to the bark, and vary in colour from white to brown or black. in shape from nearly flat to hemispherical. Cut off and burn as many branches and leaves as can be done without injury to the plant, then pick the scale off the remainder with a pointed stick. In the case of roses, which they particularly affect, if near the pruning season, cut off the younger branches by the second bud from the base and cover the stem and branches with a mixture of bullock-dung, soil, and water made into a thick paste. After a time this can be removed, and the bark will be found quite clean.

The life history of this remarkable insect is thus described in the Encyclopædia Brittanica:—"We frequently perceive on the branches of various trees multitudes of small rounded bodies resembling scales, adhering closely to the wood, and presenting no indication of any external organs. These are insects of the genus Coccus. The larva of both males and females on first quitting the egg are tolerably active and run about among the leaves and branches. They are, however, so extremely small at that period as not to be distinctly discernible without the aid of a microscope. They are flat, ovalar, apterous, with short and indistinctly articulated antennæ. The males have no apparent organs of manducation (chewing), although the females are furnished with a small, extremely short, almost conical beak, inserted between the first and second pair of feet, nearly perpendicular in its direction and composed of a four-jointed sheath containing a sucker of three pieces. It is with this instrument that they pump the juices of leaves and tender stems. They fix themselves to change the skin several times; and when a certain size is attained, become definitely attached to same chosen spot, where they form a little nest protected by a tapestry of cotton. They then attain the perfect state and are apterous (we speak of the females) even in that otherwise complete condition when, the insect having attained its full growth, the abdomen is found filled with a multitude of minute eggs. The larva of the males are less numerous; their mode of sustenance is not distinctly known; but they increase in size, and after a time the skin hardens and serves as a cocoon, in which they undergo their transformation to the nympha state. In spring the nympha comes forth: it has a pair of long wings attached to the thorax. The male is less than the female, but more active. When perfect it sets off in search of the other sex, which still remains fixed. The oviposition of the female is another remarkable peculiarity of these insects. Though excluded from the body, the eggs do not appear externally, but are made to pass beneath the abdomen and between it and the cottony tapestry above alluded to. In proportion as the insect becomes empty, the lower surface of the abdomen approaches the upper one, so as to leave beneath the body of the insect a kind of arch or cavity for the reception of the eggs. The perfect female never stirs a step, and having laid her eggs she dies. Her body shrivels up and forms a covering for the incipient young."

GREEN FLY—APHIS

Is a little insect often green, but to be found of a great variety of colours, which is to be found in myriads on the tender shoots of rose trees and other plants at certain seasons. Washing with soapy water kills them.

Sparrows and Lady-birds eat them and ants milk them. This singular process is thus described by Huber :—

"The abdomen is furnished with two hollow tubes at its posterior extremity, from which a drop of transparent liquid frequently exudes. It partakes of the property of sugar, and is much sought after by ants, who suck it with avidity from the living aphides. The desired liquor seems to be given out voluntarily by the aphis when solicited so to do by a gentle tap from the ant's antennæ. For particulars regarding the wonderful system of breeding in which one fecundation produces five generations, so that one single mother may be the means of producing 5,904,900,000." See the "Encyclopædia Britannica," VIII. edition, vol. IX., fol. 171.

THRIPS.

Minute white or black insects that infest the undersides of the leaves of many plants, especially crotons, when crowded near a house or in a verandah, and work much mischief. Washing repeatedly with soapy water at short intervals with a sponge or rag keeps them down. An ounce of kerosine well mixed with a gallon of soapy water is a good remedy, but it is not as safe as the soap and water only.

ROSE-CHAFFER

Is a beetle which eats the bark of small branches of the rose and works serious mischief. Fortunately they are not very numerous, and are easily caught. Take a pair of flower-gathering scissors in one hand and a pan of tar in the other; catch the beetles and drop them into the tar. If the branch has been seriously injured cut off beyond the wound.

The larva of many Lepidopterous insects (moths and butterflies) are very serious pests in gardens. Caterpillars are produced immediately from the egg: they are furnished with several pairs of feet, and have the shape and appearance of a worm. One small sort attacks rose trees in great numbers at times; to cut off and burn the infected branches is the best remedy. When that course is not advisable, an infusion of tobacco sprinkled over the plant frequently will prevent their attacks from making progress. A large caterpillar of a purplish colour, which feeds chiefly at night or early morning and attacks rose buds, eating into the heart of the bud at its base and destroying the bud, is a formidable enemy. It drops to the ground if disturbed, ready to go up the stem again the first opportunity. A light and a pair of scissors employed before daybreak is the only remedy I know of.

MEALY BUG—COCCUS ADONIDUM.

A white mealy insect that sometimes propagates itself with great rapidity and is very unsightly. Repeated washing with water from a syringe or a jet that can be applied with some force will destroy it, and the kerosine oil mixture above noted may be used. When this pest is observed, the plants should be cleaned daily during the following week. This will destroy the colony of insects, and the plant will probably remain clean a long time.

A large kind of bug occurs near the end of the rainy season on Sesbania trees growing in sheltered situations, and give off a very disagreeable smell. The numbers being overwhelming, ordinary measures are of no avail. If the tree is not a valuable one, a pile of straw built round the stem and set fire to, is an effectual remedy.

The larva of the stag beetle, *Lucanus cervus*, attack mango trees severely, and probably the fine varieties of the mango more than others, or is it a fact that we observe such trees better than others? The attack of the insects appears by a hole in the stem with a quantity of saw-dust-like particles o the wood lying near its mouth. Warm tar poured into the hole until it is filled will stop its destructive work.

The larva of a large beetle, which is very destructive to the roots of plants, occurs frequently in partially decomposed manure. The only remedy that appears practicable is to let the manure decay thoroughly, retaining its valuable constituents by keeping moist and covering with earth. Whether this plan is effectual by means of permitting the larva to assume another form or by preventing it from developing is doubtful.

RED SPIDER

Is an insect minute enough to be scarcely visible to the naked eye, yet sufficiently powerful collectively to work an immense deal of mischief to melons, cucumbers, tea, and many other garden plants, causing the leaves to curl up by destroying the cuticle on the lower side. Hot dry weather favours this insect and moist weather retards its work.

The mixture of kerosine oil 1 ounce to 1 gallon of soapy water well stirred is effectual in destroying it, if the plants can be dipped in the mixture three or four times at intervals of two days.

HOW WORMS ARE FOUND IN FRUIT.

Worms are found in many fruits while on the tree, and in a few instances the fully developed fly is found in the inside of the fruit when opened. The well-known variety of mango found at Wye is an instance of this, and excites great wonder among people who have not had an opportunity of learning how the fly got to the inside of the fruit. Probably the easiest way to explain this will be to narrate the life-history of a common insect as follows. The life history of the tussar silk-worm, *Bombax mylitta*, which is to be found in our gardens, is easily observed. The eggs, which are pale coloured, depressed globules about $\frac{1}{10}$th inch in width, are abundant on *ber* trees (*Zyzyphus jujuba*) during season. From the eggs issue caterpillars, at first about $\frac{1}{6}$th inch in length, which begin to eat the tender shoots of the *ber* and rapidly increase in size, changing the skin several times, at each successive moult appearing in wonderfully beautiful colours, a greyish yellow lighted up by rows of brilliant golden specks on each side. If food is abundant, the caterpillar grows in ten weeks as large as a man's forefinger, and then begins to spin its cocoon this finished, it rests some time in the *pupa* state. From the cocoon then emerges the *imago,* or perfect insect, a moth reaching four inches in the expansion of the wings. The moths are of distinct sexes, which meet, and the female having laid a large number of eggs her course is finished.

The tussar silk-worm lives fairly in confinement if regularly supplied with fresh branches of *ber* or of *ain, nandrook, China mindie,* and many other plants, and the whole enquiry into the life-history of the insect is to some minds full of interest and pleasure. A bird's cage covered with mosquito netting is a suitable conservatory for tussar worms, and it is better to begin the enquiry with cocoons. A few of these should be gathered from the trees and hung up in the cage. In due time the moths will appear and the eggs be laid on the walls of the cage. From the eggs, about ten days later, the worms will emerge, and feeding must be carefully attended to. If starved or in bad health, the worms will attempt to form a cocoon much earlier than the full time.

Enemies to be guarded against are birds, rats, squirrels, lizards, and frogs. Many people have attempted to domesticate this worm as the common silk-worm is kept, but after a few generations the worms kept in confinement become weakly and die out.

From this account of the life of one insect, the occurrence of worms in fruit may be understood. The parent insect in many instances lays its eggs within the skin of a young fruit; the young maggot is hatched, and grows in the fruit, feeding on the provision for it close at hand, until it eats its way out or arrives at the *imago* stage, when it may fly away, as occurs in the Bunga mango. Often small tumours may be found on leaves, which when opened disclose a small worm that has been reared in a similar way.

TO PREVENT WORMS IN FRUIT.

Gather all the fruit that has any sign of worms being in it and burn them and induce your neighbouring cultivators to do the same. The supply of that particular insect will be much less the following year. There is no feasible plan known which will prevent the development of worms in the fruit which have been hatched as described. The parent insect being winged arrangements of tar and other viscid substances on the stem will not prevent the insect from having access to the fruit.

RATS.

Several species of rats are very fond of the roots of the gesnera and some other rhizomes because of the starch they contain and of the pith of young mango trees which are sometimes attacked underground: in other instances the damage is done above the surface. Among plants prepared for grafting the loss is at times great. The rats appear to get very little to eat from each plant, and go from one to another working great mischief.

White arsenic mixed with ten times its weight of fat and five times its weight of bread in fine crumbs, and carefully kneaded is an excellent medicine for them. It should be worked into pills by a person without wounds on the hands, or better use a pestle and mortar. The pills should be placed near the parts the rats infest.

MILDEW,

A minute fungoid growth which covers the young leaves of rose trees and some other plants with a coating of a white colour, and by covering up the stomata, prevents the exhalation of vapour and causes the leaves and flower-buds to shrivel up. A close moist atmosphere encourages this pest, and dusting with flowers of sulphur is said to remove it. The action of the sulphur is not clear, and whether it is effectual is doubtful; probably if any kind of dust is applied and sufficient patience brought into play the plants may overcome the parasite, or the parasite may change its form and disappear.

THE PEA MILDEW—ERYSOPHE MARTII.

When mildew attacks your crop of peas examine the soil carefully; if dry, water freely, using weak liquid manure a few times; if wet, provide drainage and take any other measures you think likely to maintain the vigour of your crop: by doing so it will probably be able to withstand the mildew. When this pest appears on rose trees and other plants of a similar kind, besides the precautions noted above, cut off and burn all affected parts.

A recent American publication says to avoid mildew sow peas four inches deep. This is one means of keeping roots in a cool moist medium and will assist in keeping the plant strong and able to resist mildew; but as a means of preventing it, a trial recently made has proved it ineffectual. It is interesting to note that in the trial a depth of six inches did not prevent the pea seed from germinating well in friable soil.

THE CONSERVATORY.

THE principal object of the conservatory in this country is to maintain a cool moist atmosphere suitable for ferns and other shade-loving plants. Such a place has a special charm when a burning sun and hot winds are scorching up vegetation out of doors. The design of the conservatory may well be left to individual taste, as the condition of the inmates will be but little affected by it. Yet some styles harmonise with the elegant creepers which form such a striking ornament to, and at the same time are part of, the conservatory itself. The octagonal house which is so common at present is about as bad as possible for displaying the creepers, and is very often perfectly ugly by its want of harmony with its surroundings. A Gothic cottage would be better in many situations, but the style of the bungalow should always be considered. The octagonal form has one recommendation: if it does not adorn, it does not often put the bungalow it adjoins out of countenance. Regarding material, wood is the best available—iron is such a rapid conductor of heat that only very hardy plants will adhere to, or thrive in contact with, it. The wood-work may be made to hold together with bolts, so as to take to pieces easily when required to be removed. As a covering for conservatories glass has been tried, but is generally voted a failure, because the sun's rays pass freely through it, and a portion of them are reflected from the plants and other objects, but so weakly that the rays, unable to repass the glass, are again reflected, and add greatly to the heat of the air in the conservatory—a condition by no means desirable in this country. Chicks or tatties have been more successful, but my own experience says that a thin quality of cocoanut fibre matting, that may be purchased for about three annas per square yard, is the best—it admits sufficient light, is durable, when heavy rain falls it allows a gentle shower to come through on to the plants, and if properly put on, there is no drip. The pitch of the roof should not be less than 33° and the matting fairly well stretched. The last paragraph was written in January 1876, and was at that date the result of two years' experience. Since that date more extensive use and longer experience has added greatly to my estimation of its value, and it has come into very extensive use. The Superintendent of the Tanna Jail manufactures an excellent quality, which is very thin and durable. Although it appears to admit a great deal of light, the most delicate ferns thrive under it during a Deccan hot season.

Split bamboos laid horizontally on the rafters about half an inch apart are also an excellent covering and rather more durable than matting. In laying on the bamboos the outer side of the bamboo with its convex curve should be kept upwards, so that the rain may run off freely and not cause heavy drops to fall in particular parts.

About Poona many conservatories such as are described above have been built, and in some cases the roofs are kept so low that one's head is in danger; in others the plants are packed so closely that there is not room to move, and one of the chief uses of a conservatory is overlooked. A place of this kind, if properly arranged, ought to be a delightful resort for many kinds of work during the hot part of the day, and if the open part is directed to the drawing room windows instead of to the front door it would be an improvement. The site of a conservatory should be thoroughly drained, because much water must be used and stagnant water would soon put an end to the anticipated comfort.

The sides may be made with twine netting and covered with choice climbers. I have seen bamboo tatties in such positions, but the bamboo gets worm-eaten and falls to pieces.

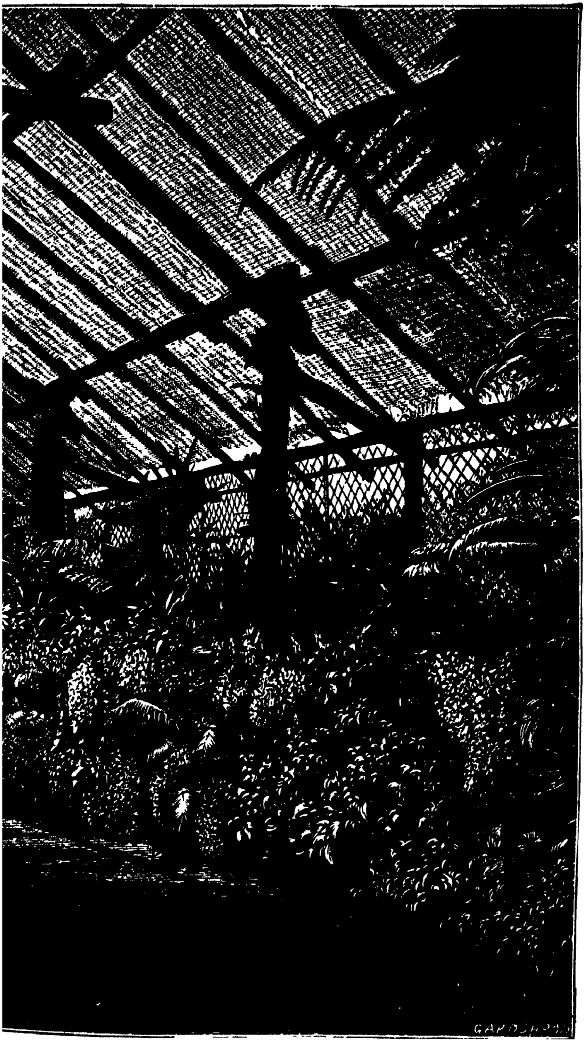
The climbers which cover the sides should not be permitted to grow on the roof, or they will exclude light and work mischief thereby. Choice climbers that love shade, such as the *Cissus discolor,* may be trained up the interior posts. Woodwork staging to stand delicate plants on, so as to have them near the eye, as is generally used in Europe; can scarcely be recommended in this country ; stages built with brick are better, the interstices between the bricks forming a congenial site for ferns ; they soon make themselves at home, and the effect is very pretty. The floor may be made with fine sifted gravel with the earthy matter washed out, so that it will receive frequent watering and yet not wet the visitor's feet. Among the plants which thrive particularly well in such a structure, Ferns, *Caladium, Dieffenbachia, Gloxinia, Dracæna, Begonia*, *Croton,* and many Orchids may be named, while the moist atmosphere with free exposure to sunshine on the outside is particularly favourable to *Poivrea, Stephanotis, Antigonon,* and many other choice climbers.

The larger the size of the conservatory the more equable will be its temperature and the better the growth of the plants usually kept in such a structure.

MANAGEMENT OF THE CONSERVATORY.

THE remarks that have been made in treating of the plants that are grown in the conservatory leave but little to be said here except on the degree of moisture to be maintained. From June to January there is very little danger of having the atmosphere too moist; and should pure water be available, the whole of the plants, paths, and stages may be syringed three times daily with advantage, excepting plants that are in flower, which should not be syringed, as the water promotes decay of the flowers. Very often the water will be found to carry so much foreign matter, either dissolved or in suspension, that to syringe the plants would be simply to load them with the dirt which the water leaves behind when it evaporates: in this case the watering to keep the atmosphere moist should be confined to the paths, stages, and to such plants as possess minute pubescence which causes the water to run off at once. During the months from December to April, when all plants in some degree go to rest, the atmosphere of the conservatory must be kept much drier. At this time one watering every evening on the paths and stages will be found sufficient. If the atmosphere is kept saturated at this season, it induces weakly growth and will prevent orchids from flowering. Endeavour to follow and ameliorate the natural climate in managing the conservatory, by watering freely during moist and cloudy weather and gently when the air is cool and plants are at rest.

INTERIOR OF C



GANESH KHIND.

THE LAWN.

WITH an abundant supply of water delivered at a fair pressure in pipes and good drainage, it is quite ossible to enjoy this most charming of all garden arrangeients in this country at an expense that is very trifling comared with the pleasure and comfort it affords. The chief ecessity is daily slight watering after 5 o'clock in the evenig. This is scarcely practicable unless the water comes with ufficient pressure for the labour employed to water the area aid down as a lawn within half an hour. With a twenty feet iead of water a one-inch pipe gives sufficient to sprinkle ;,000 square feet in that time. In arranging for this work t must be borne in mind that from various circumstances it s particularly apt to be "scamped." No more should be laid out than the labour can fairly accomplish and thorough work exacted. Thorough drainage is the next consideration. If there is any danger of the water stagnating it is not advisable to attempt to make a lawn. In any case a dressing of coarse sand and road silt will be desirable, and if the soil is the fine black common in the Deccan an extra dressing of gritty material is advisable. The grass that is most generally useful for the purpose is the cosmopolitan Hurryalee or Doab grass (*Cynodon dactylon*), a plant that may be found all over India, and greets the traveller at Aden, on the banks of the Suez Canal, on the southern shores of England, and in Australia. As the seed is very difficult to collect in quantity turfs are generally planted . If turfs are scarce roots may be dug up, chopped in pieces about an inch long, and mixed with mud formed by stirring five parts fine soil and one part cowdung with sufficient water. The pieces of Hurryalee should be worked in the mud until a good coating is obtained. Then spread on the surface of the soil, cover with a thin coating of fine soil, and water gently. When the plants have begun to grow freely, roll regularly.

When turfs are procurable it is a much easier operation to cut them with a hoe and plant. A coating of sand should then be spread on the surface and swept into the interstices. If sea sand is available it should be employed, and an occasional watering with sea water will be advantageous, as this plant thrives in such circumstances and gives the short close growth desirable in a lawn.

Imported lawn grass seed may also be used to produce a fresh green surface. For this purpose the soil should be dressed with road scrapings or the sand that has been washed from roads, and seed sown broadcast at the rate of thirty pounds per acre. It is advisable to test the seed by sowing a small quantity in a flower-pot and watering carefully. A week will suffice to show whether the seed is good, although in that time only a part of it will have germinated. When sown, the seed should be covered very slightly with fine soil and rolled or beaten down, then watered gently twice daily during the first fifteen days. Afterwards when the grass is up water every evening is sufficient.

As the lawn is often damp from the usual watering in the evening and from dew in the morning, any plants that are set out on it should be of a sufficiently distinct character to be effective at a distance. In such a position small palms are particularly suitable, and may be raised above the general surface by making a trench at the outline of the proposed plantation and throwing the soil towards the centre. This increases the depth of soil, and is a convenient arrangement for watering, as the trench can be filled at intervals. The sloping sides of the bed may be turfed or planted with Zephyranthes or Alternanthera. To keep a lawn in good order a mowing machine is indispensable. Be careful in selecting one and buy the highest priced one for its size that is procurable. First class machines have self-sharpening arrangements and can be kept in order without skilled labour. Cheap machines cut as well as others for a time, but give endless trouble afterwards. One machine by Shanks was worked by coolies at Gunesh Khind for more than ten years without any trouble from breakages.

EXAMINATION OF A SEED.

TO illustrate this chapter procure a few grains of gram, peas, or beans of any kind, and a few castor-oil seeds or seeds of the Moglee yerendie (*Jatropha curcas*). If dry, soak in water an hour or so.

Dissection of a seed.

As an introduction to these Hints, which may enable us to enjoy our gardens somewhat more, let us take up a few seeds and some common plants and examine them together. To begin with, we will take any sort of pea or bean, the larger the better, that has been soaked in water to make dissection more easy. On the outside we find the small oblong scar (hilum)* very distinct in some beans from a difference in colour from the skin of the seed (testa).† The skin is easily removed, and the inside portion will readily divide into two halves. Examine these halves carefully; they are the first two leaves of the plant and are called seed-leaves (cotyledons).‡ The seed-leaves do not much resemble the ordinary green leaves of a plant, but between this fleshy pair and the ordinary green leaves, as we gain experience, we will find a very gradual transition, clearly proving to us that these two halves that our pea has divided into are really leaves. Nestling between the seed-leaves we find a little bud with a pair of rudimentary leaves (plumule) and the beginning of a root (radicle). The seed-leaves are in this instance thick, and contain, among other matter, a quantity of starch, which undergoes a change when the seed begins to grow (germination),§ becomes soluble, and serves as food for the young plant before it is able to find sustenance by means of its own root and leaves.

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* L. *hilum*, a speck.

† L. *testa*, a shell.

‡ G. *kotuledon*, a cup-like hollow.

§ L. *Germen*, the bud of a tree, a young twig.

The seed.

The entire seed, then, is an embryo plant; it has the rudiments of a stem and of a root, and has a store of food laid up to assist the young plant during its early struggle for existence.

In the pea or bean the store of food is in the seed-leaves; but if we examine the seed of the castor-oil plant *(Ricinis commnuis)* or its near relative, the "Moglee yerendie",*(Jatropha curcas)*, we will find the seed-leaves are not thick or fleshy, but are very thin; and although white, somewhat resemble ordinary leaves by the arrangement of the veins. The store of food for the young plant in this instance is the white cheese-like portions; it is from this that the castor-oil is expressed. A seed with the food store outside the seed-leaves, as in this instance, is called albuminous, while the opposite condition, such as is to be found in the pea, is called exalbuminous.

EXAMINATION OF A PLANT.

THE reader should be provided with a whole plant, or at least a branch in flower, of one of the following plants as illustrations to this chapter:—

English Name.	Botanical Name.	Vernacular.
Cotton	Gossypium herbaceum	Kapus
Bendy	Hibiscus esculentus	Bendy
Shoeflower	Hibiscus, any species	Jassoondie
Ambaree	Hibiscus cannabinus	Ambaree
Bendy tree	Thespesia populnea	Bendy ke jhar

or any of the very numerous plants that are known in the vernacular as rân bendy.

The seeds of cotton, ambaree, or bendy have the same arrangement of the food store for the young plant as the castor-oil seed, but are smaller and more difficult for a beginner to understand. Let us imagine we have sown a cotton or a bendy seed in a favourable soil with a suitable degree of heat and moisture. The embryo plant starts into growth at the expense of the food provided for it in the seed combined with water, but it soon sends its seed-leaves up into the air and its root down into the soil. The leaves are green from the presence of a colouring matter *Chlorophyll*,* in the cells of which they are built up, but are provided with a protective layer on both sides destitute of this green colour and furnished with openings, generally on the under side, called stomates, which lead into open spaces between the cells of the leaf. Through the stomates the leaf takes in carbonic acid gas and decomposes it into its elements, carbon and oxygen. The carbon combines with the elements of water and is retained by the plant; the oxygen is set free to be taken up by animals and combine with other bases. This striking arrangement is called assimilation; to it we are indebted for the powerful influence in purifying the air that healthy living plants are acknowledged to possess; but in dead leaves, decaying flowers, and ripening fruit the operation is reversed: these take up oxygen and give out carbonic acid. On this account all dead leaves should be kept buried under a good covering of friable earth until they have thoroughly decayed. Besides absorbing the offensive gas, the earth that is mixed with or covers decaying leaves is brought into a soluble form by the action of the carbonic acid, and becomes a valuable manure.

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* G. *chloros*, grass, green, *phullon*, a leaf.

Assimilation.

Let us look at the leaves on the branch of the *bendi*, *shoe-flower*, or *cotton* we have provided for illustration. We find that each of the leaves has a stalk (petiole),[*] and that at the base of the stalk on the young leaves we find a pair of small leaf-like organs (stipules).[†] These may have fallen away from the older leaves, as the protection they gave when the leaf was young is not now required, but by the exercise of reasonable perseverance, we may see the scar showing the place of attachment.

Phyllotaxis.

The arrangement of the leaves may at first sight appear irregular, but it will be interesting to observe that as a rule it is quite systematic. If the eye is fixed on any one leaf and another sought on the same plane, it will be found that four leaves intervene between the first noted and the second, or, if we call the first noted number one, the second will be number six. Starting from number one, to bring the next higher in line with the eye it is necessary to turn the stem round a bit, and so on, until by the time we arrive at number six the stem has turned round twice, therefore if the leaves were arranged in a circle each one would be distant from its neighbour two-fifths of the circumference. This admirable arrangement for securing the best exposure of each leaf to light and air is called phyllotaxis;* the two-fifths arrangement is most common, but in the teak, *saag (Tectona grandis)*, and the *shewan (Gmelina arborea)* the arrangement is half, that is, each leaf is one-half the circumference laterally distant from its next neighbour, and in other instances, as in the *keura (Pandanus odoratissimus)*, the phyllotaxis is very intricate.

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[*] L. *petiolatus*, a little foot.

[†] L. *stipula*, a stem.

Leaf axil.

Look carefully at the angle formed by the stalk of the leaf and the stem (axil)—there is a bud at this point, and you will soon find that it is characteristic of a leaf to have a bud in its axil. Compare this condition with a branch of a rose tree. In the rose the bud can be easily seen seated in the axil, not of one leaf, as in the bendi, but apparently of a stalk bearing from five to seven small leaves. If the small leaves are examined carefully it will be seen that the axils do not contain buds; from this we conclude that these small leaves (leaflets) are portions of one leaf, which, being divided into several parts, is called compound, while the opposite condition, that of having the leaf in one part, is called simple.

Hitherto we have been going up the stem, and it will be advisable to return to our starting point and examine the root. In the pea we found the beginning of a root, and may as well note while here that the point of this root touches a part of the skin of the seed where there is a minute aperture (micropyle),† of which we will learn the importance in the next chapter. The root grows downwards, serves to fix the plant in the soil, and to draw up water containing the mineral food of the plant in solution. The root is not green, it seldom developes leaves, and is furnished at the end with a sheath of scales which protects the growing point as it forces its way through the soil. This cap on the end of the root (pileorhiza) will be easily seen on the ends of the aeriel roots hanging from the branches of *wad* trees (*Ficus Indica*)or on the very thick roots of *keura* (*Pandanus odoratissimus*).

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* G. *phullon*, a leaf; *tasso*, I arrange.

† G. *micros*, little; *pule*, a gate.

Transpiration.

The root absorbs moisture from the soil, containing mineral matter and gases in solution. The greater part of this moisture is evaporated through the leaves and green bark (transpiration),* leaving the solid matter behind. The quantity of water thus withdrawn from the soil under the influence of bright sunshine must be very great. When we cut down a banana tree, *kaela* (*Musa sapientum*), the water may be seen running from the cut surface in quantity sufficient to soak the ground near the wound, and the action of Australian gum trees in this manner has been used to drain the Pontine marshes near Rome.

Let us now return to the stem of the plant where we left off. In the axils of some of the upper leaves we find a stalk bearing a flower (peduncle).† The flower has a whorl of five little green leaves (sepals) united together and forming a little cup (calyx) in which the other parts of the flower appear seated. In the shoeflower (*Hibiscus rosa-sinensis*) and the *ambaree* (*Hibiscus cannabinus*) there are five small modified leaves (bracts), in the cotton (*Gossypium herbaceum*) three large fringed bracts, beneath the calyx, which are spoken of collectively as an epicalyx.* Inside the calyx we find another whorl of five bright-coloured leaves (petals), which are spoken of collectively as the corolla; the two whorls, *calyx* and *corolla,*† are called the *envelopes* of the flower, as they enclose the essential organs. Let us now make a vertical section of the flower by passing a penknife up through the calyx and corolla. We find we have cut open a tube much branched at its apex, with each branch terminating in a little coloured knob. This is a whorl of small organs which in many plants stand free from each other, but in the plants we use for illustration are joined together into a tube at the base, an uncommon condition out of this family. Each of these organs is called a stamen,‡ its stalk a filament,§ and its head an anther.‖ The anther is filled with a fertilising dust in the form of double-coated cells called pollen,¶ which is carried either by insects or by the wind, or mechanically, to the five little cushions (stigma) seen in the centre of the flowers. When ripe these little cushions are furnished with a viscid substance to which the pollen adheres: its inner coat then begins to grow, and sends down through the stalk of the stigma (style)** a long tube which enters the rudiments of seeds (ovules) found in the little conical body in the middle of the flower (ovary) by means of the minute opening previously alluded to, the micropyle. This done, fertilisation is accomplished and the ovules are in a fair way of becoming ripe seeds fit to reproduce the parent plant. The flowers that are commonly called lilies differ in a slight degree from the type described here : we have not the calyx and corolla of distinct colours, but generally all one colour, and the term perianth* is used to distinguish this kind of floral envelope. In the grasses and sedges the floral envelopes are reduced to dry scales; in caladiums and other allied plants they are entirely wanting or represented by minute scales.

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* L. *trans*, through ; *spiro*, I breathe.

† L. *pedunculus*, a little foot.

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* G. *epi*, upon, *calyx*, a flower cup.

† L. *corolla*, a small crown.

‡ L *stamen*, the standing thing, the warp of an ancient web.

§ L *filum*, a thread.

‖ G *antheros*, flowery.

¶ L *pollen*, fine flower.

** G *stigma*, a mark made with a sharp instrument.

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* G. *perianth peri*, around, *anthos*, a flower.

EDGINGS.

EDGINGS are intended for the demarcation of spaces allotted for particular purposes, for instance, flower beds, in a garden if not cut out on grass should have an edging of some kind. Dwarf plants are generally used; but if water is scarce and the beds not constantly kept full of plants an edging of neat tiles made for this purpose is desirable.

An imitation of the edging tile in use in Europe may be obtained at Poona, but of such a rude description that it is little better than common bricks set on edge. A neat edging tile would certainly find many buyers if offered at a reasonable price, and it is to be hoped the makers of Mangalore tiles will see their way to producing such a convenience soon.

GHAR EDGING.

A white crystaline stone, which is abundant on the low hills of the Deccan, called *ghar* in Marathi, makes a very pretty edging when broken so as to display a fresh surface and neatly arranged. When fresh its colour is too glaringly white if arranged in broad lines, but in narrow lines of short length it looks well. An edging should be proportionate to the width of the path and the size of the flower bed it separates. If distinct it can scarcely be too small; two or three inches in height is desirable for general purposes. Eight inches high is permissable as an edging to a wide road, but anything higher takes the character of a fence and appears out of place.

Width is often a desirable feature, with Alternanthera cut down to three inches high, a width of fifteen to eighteen inches looks well.

ALTERNANTHERA AMABILIS.

This plant was introduced into gardens in Madras about 1870, and immediately took full possession of Indian gardens as an edging to the exclusion of nearly all other plants, and the mallees in Western India have transferred to it the name "Tew" previously applied to *Justicia gendarussa.* That its popularity is deserved there is no question ; on the side of a path fully exposed to the sun, no other plant is so easy to manage if water is abundant. This plant "sports" freely; three distinct varieties have become fixed and many more of less permanent character may be selected in any large garden.

The typical *Alternanthera amabilis* has elliptical acuminate leaves varying in colour from green to bright crimson.

Alternanthera (amabilis) amoena has small spatulate leaves (increasing in width from the base upwards) and a dense habit of growth.

Alternanthera (amabilis) tricolor has ovate leaves (like longitudinal section of an egg) with a green margin, rose centre, and purple veins.

JUSTICIA GENDARUSSA *(Jugut-Mudun).*

A dwarf plant with willow-like lance-shaped leaves, forms an excellent edging; prefers a heavy rainfall. Propagate by cuttings planted during the rains.

This plant enjoys shade, and when planted at the side of a wide road shaded with trees no edging looks better. Clipping twice yearly is necessary. It should be kept about 8 inches high.

PARADANTHUS TITHYMALOIDES, *Vilayti Sher,*

Is in very common use as an edging. It has an advantage in growing in any garden soil that is open and friable, requiring no watering after it is once established. A very prettily variegated variety was found at Gunesh Khind in 1870.

When it has become more plentiful, it will make a very striking edging.

PLUMBAGO CAPENSIS, *Chitrak.*

This plant, by frequent clipping, may be brought into a dence form, and is very well suited for edging wide roads. Propagate by cuttings of ripe wood. It thrives best at an altitude of over 2,000 feet above the sea.

THE MINIATURE CHINA ROSE

Makes a beautiful edging, as it bears clipping well and flowers nearly all the year round. Any rich open soil well drained is suitable. Cuttings should be planted in a shady spot during the cold season and transplanted to their permanent quarters at the beginning of the rainy season if the rainfall is slight, or at the end if the fall is over 50 inches annually.

If clipped twice yearly and regular attention given to fill up blanks, this rose will make a neat edging about 8 inches high; therefore it is well suited for flower beds about twenty feet wide. Smaller beds look better with a more dwarf edging.

FENCES.

NOTHING affects the appearance of a garden more than the condition of the fences, which must be of a neat and regular character; and by a proper selection of plants for the purpose, they may be made to form one of the chief graces of the garden. Where cattle are not grazing regularly, the ugly lines of prickly-pear and milk bush that are so common are very objectionable. Some of the following plants make a perfectly efficient fence, defying the inroads of cattle, while enlivening the scene with brilliant flowers.

If the soil is very rocky and water scarce a fence of iron post and wires is the most suitable, and is probably cheaper in the end than any live fence however hardy. It may be said it does not cost much to plant a fence of prickly-pear in the dry parts of India, but the value of the land a prickly fence occupies is often considerable.

A wire fence is efficient at once, but a living fence needs care and attention, which adds greatly to the first cost.

POMEGRANATE—PUNICA GRANATUM, *Anar, Darimba, Dalimba.*

The pomegranate is a fine fence plant, suitable for a deep calcareous soil and a rainfall under 40 inches. Propagate by cuttings for the double and by seed for the common variety.

In making a fence of this plant open a trench two feet wide and the same in depth laying the surface soil and the subsoil on opposite sides of the trench. Fill in about six inches of town sweepings and cover with the surface soil. Take six inches deep of soil from the side of the trench on which the surface soil had been laid and fill up the trench. Mix the top layer with a little manure and make up the sides with the soil taken from the bottom of the trench. Put in the plants carefully and water freely during one dry season; after that the roots will be sufficiently deep to dispense with watering.

All fence plants should be put in with as much care as is given in this case. A little extra labour at the beginning more than repays its cost by saving in work and effectual protection at later stages.

CITRUS ACIDA, *Jamboorее, Jambira.*

In a deep soil this useful thorny shrub forms a most excellent fence. To make a fence of this plant prepare the ground as noted above and sow fresh seeds as they are taken from the fruit, two inches apart, in the line they are to remain in. The object of sowing the plants where they are to remain is to preserve the tap root, which is so essential in a dry climate, as it goes deeply into the ground where moisture remains available if suitable preparation of the soil has been given.

CASUARINA MURICATA.

In a very sandy soil or any good soil of a very open friable nature and with a good supply of water this tree makes excellent fences if kept regularly cut in and trimmed. The internal fence in the Public Garden at Kohlapur is of this tree and the effect is very fine. Propagate by seeds, which should be sown thinly on a bed of very sandy soil as soon as ripe.

INGA DULCIS,

If permitted to grow, becomes a large tree, but may be cut to form an impenetrable fence. It thrives on a deep soil if sown where it is wanted to form the fence. And with care becomes impenetrable in one year.

DODONÆA VISCOSA, *Zakamee*,

Is one of the best plants for edging to wide roads, and for internal division in a garden or to hide objectionable objects is very useful. If the soil is deep, after the first year it does not require water, and may be clipped regularly to keep it in shape. It is raised from seeds only, and prefers a sandy soil.

DURANTA PLUMIERI, *Malkangunee*,

Makes a most beautiful fence, quite impenetrable to cattle. Its lovely blue or white flowers and little racemes of golden fruit are always interesting. It succeeds well in deep black soil on the Deccan without irrigation if planted carefully as directed above.

LANTANA ACULEATA

Makes a very good fence in situations where the rainfall is over 50 inches. The shears require to be used freely to keep it in order. Propagate by seed or cuttings.

LAWSONIA ALBA, *Mendie*, *Henna*, *Gounta*,

Is excellent for interior fencing, where it is not subject to depredations from cattle. Propagate by seed or cuttings in any good garden soil and keep in order by clipping twice yearly.

VITEX NEGUNDO (THE CHASTE TREE), *Nirgoondi*, *Sindoowara*, *Nishimda*, *Sindooka*,

Forms a beautiful fence in situations where the rainfall is over 50 inches yearly. Propagate from cuttings or seed.

BOUGAINVILLEA SPECTABILIS.

With a rich open soil, plenty of water, and good drainage this plant makes an exceedingly rich and impenetrable fence. A light trellis should first be made to train the plant on, and by the time the trellis has decayed, the plant will be strong enough to stand alone. Propagate by layers and plant six feet apart. Tie in the rampant shoots close to the trellis and prune freely where too thick.

HÆMATOXYLON CAMPECHIANUM, THE LOGWOOD TREE, *Patung,*

Makes an excellent fence and bears clipping well. It is suitable for a situation with a black soil and a rainfall not over 40 inches annually. Propagate by seed, which should be sown where the fence is required.

EUPHORBIA TIRICULLA, *The Milk-bush, Sher,*

Makes a stiff formal fence. The milky sap is very acrid. Propagate by cuttings.

PRICKLY-PEAR, *Negadoung, Naga-kalee, Nag-phunee,* and EUPHORBIA NERIIFOLIA, *Thor,*

Are excellent fence plants for railways in dry situations or for preserving embankments from the effects of heavy rain: their chief recommendation is, they may be planted at any season.

AGAVE AMERICANA

Makes good fences in moist situations if planted on an embankment, so that the roots have an open dry soil to grow in. Propagate by offshoots.

AGAVE VIVAPARA, *Guipat, and* AGAVE CANTULA

Are similar in use and treatment to the above.

JATROPHA CURCAS, *Moglee Yerendee, Baghbarinda Napalam.*

In situations with a heavy rainfall this plant makes a good fence. The seeds yield a large proportion of oil fit for lamps.

Propagate by seeds or cuttings. This plant is hardy and will grow where few other nice fence plants would thrive.

CAPPARIS SPINOSA, *The Caper Bush*, *Kabar, Kalvari.*

This useful thorny shrub grows wild on the hill ranges throughout India, and might be utilised as a fence plant in such positions. Its thorns would effectually resist cattle and its flower buds ought to be pickled in vinegar, as is done in Southern Europe, where this plant yields the costly condiment called capers.

CLERODENDRON ACULEATUM.

A shrub of slow growth and small myrtle-like leaves protected by short thorns. Will make a neat and effective fence. Cattle will not touch its bitter thorny shoots, and its small white flowers have a delightful fragrance early in the morning or while the air is moist. When established in good soil, it does not require irrigation, and it is easily propagated by cuttings.

ACACIA FARNESIANA, *Kusturi, Vitkhira, Gooja baboola, Eree baboola.*

This shrub makes a very efficient fence and thrives in any but the thinnest soils without watering. In making a fence of this plant the soil should be stirred deeply and the seed sown where the fence is wanted during the rainy season and watered occasionally during the first few months. The travellers' bungalow at Kolhapoor is enclosed by a fence of this plaint and the effect is very satisfactory.

HORTICULTURAL MYTHS.

AMUSING notions regarding plants appear to me not to be confined to any particular people. In England a carpenter or barber will gravely show one how to make a gardener's cut so as to ensure the growth of a cutting. According to such authorities a cutting should be made so that the cut end may form a very obtuse angle or should be sloping, while professional propagators usually make their cuts transverse.

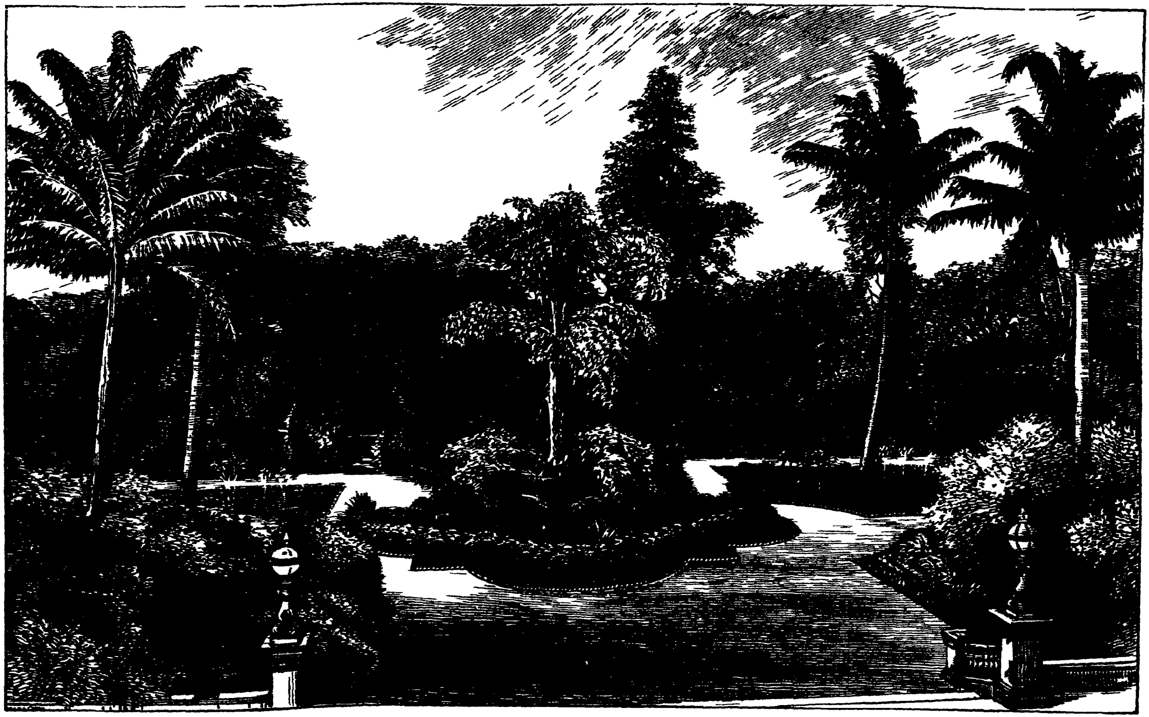
India is not without such myths. Many classes of people except cultivators say that if a young guava tree is split open, the pith removed, and the wound tied up, the tree will bear fruit without seeds, and the fact that many normally seed-bearing fruits are without seeds is explained in this way. It might be wrong to say that the pith has nothing whatever to do with the productions of seed, although in the instance of the guava it certainly has as little to do with the production of seed as any other part of the tree, and the operation described will certainly not have the effect it is stated to have. To explain this matter fully it would be necessary to go deeply into vegetable physiology, which is impracticable in a book of this kind. However, attention may be invited to the notes on Fertilization at page 100, where the influence of the stamens and pistil is noted. Imperfection of either the stamens or pistil only will account for the absence of seed in a fruit. The occurrence is by no means rare. The sugar-cane never has seed in its fruit. The propagation of that plant has been carried on for many years from cuttings; therefore seed became superfluous, and that nature does not retain superfluous organs is indisputable.

Another myth—the grafting of bananas—is referred to under the head of that group of plants, and is equally fallacious with the tales that to obtain fine mangoes it is necessary to soak the seed in honey and water it with milk, or the idea that grape vines may be engrafted on prickly-pear.

TREATMENT OF PLANTS AFTER A LONG JOURNEY.

Treatment of Plants after a long Journey.

THE great loss that occurs among plants introduced from Europe shows that this subject is but little understood, especially in the case of deciduous plants, such as the rose and European fruits. The common plan is to plant in pots and water freely at the root several times daily. Now as the plant on its arrival, having neither fresh roots nor leaves, is in the worst possible condition for assimilating the food supplied to it, that any survive such treatment is proof of a wonderful degree of hardiness. The proper treatment is—Plant in a dry soil; water thoroughly once; keep the plants in a cool, moist place—if dark so much the better (a bath-room is generally suitable); sprinkle gently with water twice daily; in about 20 days they will be growing; and if the roots are examined, they will be found to have made more progress than the heads; then gradually inure to light, and water more freely at the root. If no cool, moist place is available, it is an excellent plan to cover the plant entirely with a thick coating of the mixture of dung and soil that natives cover the floors of their houses with; this prevents evaporation and retains the sap of the plant in good condition. It will be understood such treatment is not advisable for plants in leaf, which should be kept in a moist place and carefully watered at the root while recovering from the effects of a long journey. Frequent watering at the root in such a case is apt to make the soil sour.



VIEW IN THE GANESH KHIND GARDEN

DESCRIPTION OF ENGRAVING

"*In Ganesh Khind Garden.*"

The central bed has in the middle a specimen of Caryota urens *(Mhar, Jeerozoo, Scunda pana)* showing its very remarkable habit of flowering. This tree grows to a height of about 30 feet before it begins to flower. The first flowering panicle is of immense size and pendulous from the axil of one of the upper leaves. The second is from a lower axil and somewhat smaller, and so on downwards until the tree is exhausted. In a garden the tree reaches its full size in about 15 years, and about seven years more are occupied in producing its flowers before it becomes unfit for the garden.

At the base of this tree are masses of *Acalypha Wilksiana tricolor*, a shrub which was introduced about 1870 and has proved of great value in the dry parts of India. Its fine, shaded, bronze-coloured foliage and hardy character when in a deep irrigated soil are very useful qualities. Between the above are dwarf fan palms, *Livistonia Chinensis*, with plants of *Yucca gloriosa* in front, which regularly throw up magnificent panicles of large white flowers between May and August. These are enclosed by a thick border of *Pancratium littorale*, one of the most useful flowering bulbous plants that is to be found in gardens in the dry parts of India where the rainfall is less than 30 inches annually. In gardens this plant is evergreen, the long strap-shaped leaves are always graceful and pleasing, and between May and September its pure white blossoms are one of the chief ornaments of the garden. This plant was described by Jacquin in 1760, who found it on the shores of the Caribbean Sea ; his descriptions, like those of Roxburgh in the "Flora Indica," are so beautifully accurate and full that the work of modern botanists suffers by comparison as far as use by people who are not intensely scientific is concerned.

The outer border is 15 inches in width of Alternanthera, which is rich with glowing shades of rose and crimson, and appears to enjoy the regular clipping, which keeps it down to 3 inches in height. An edging of pale-coloured tiles completes the central bed.

The four palms seen in the other beds are cocoanut trees and are surrounded by *Hibiscus* of sorts and rose trees. The background shows the effect produced in the distance by the graceful feather foliage of the *Gul Mohr (Poinciana regia)* with a solitary *Coula neem (Millingtonia hortensis)* towering above it.

CONSTRUCTION OF THE PLANT BOX

shown in the engraving, page 116.

The development of manufactures in India makes it evident that the beer barrel will not be long available as a plant tub, although some people will regret it could not be entirely devoted to horticultural purposes. Gardeners will let it revert to its original or any other purpose without breaking their hearts about it. Plant boxes formed of five pieces of timber held together by four bolts, which may be removed in a few minutes, the roots examined, defects corrected, and then reconstructed without trouble, are sure to supersede the unwieldy old tub. Teakwood is most suitable. In size 18 inches in length, breadth, and depth is convenient. A box of this measurement can be easily moved about by four men, who place a pair of bamboos in its handles and carry it off easily.

The thickness of the timber may be 1 inch, except in the corners, where two-inch square upright pieces have the boards let into them and are produced below to form feet. The bottom is quite loose and has five holes for drainage: it is supported on battens fixed to the side. After preparation the bottom is thoroughly soaked in warm tar and two or three coats applied to the inner face of the sides, so that a chink may not be left uncovered. In some instances it may be desirable to soak the sides in tar warmed by exposure to the sun. The appearance produced by this is, first, a bright shining black and later a dark grey, which harmonises with the green leaves perfectly.

THE USE OF TAR ON PLANT BOXES.

I find that a strong feeling on this matter prevails, but on searching into the matter I have not met anyone who could give a reason for the faith that was in him that tar is injurious to plants when applied to tubs and carefully dried before the earth was put in. I have used tar barrels and tarred my plant boxes during some years with very satisfactory results.

POROUS FLOWER-POTS.

Flower-pots that are decidedly porous are much preferred by gardeners in England—rightly, no doubt, if the plants are in a conservatory,—but in India instances occur in which porous pots are not desirable. The moist sides of a porous pot will, under a dry night wind, give off so much heat that a temperature below freezing point is produced and at noon the plant may be in a temperature above 100 degrees. Although the practice will scarcely be considered commendable, it may be useful to note that as good plants of geraniums and crotons may be seen in kerosine oil tins as any other kind of pot.

DESCRIPTION OF THE ENGRAVING.

NURSERY IN A CASUARINA PLANTATION.

IN general aspect *Casuarina muricata* resembles some species of fir and is often called a fir by Europeans. Its deciduous branchlets have much the appearance of fir leaves, but its timber is extremely hard and other characteristics of fir are wanting. In cultivating this tree the chief necessity appears to be to provide abundant water, and fortunately it is not particular whether the water is fresh or brackish, whether confined to a short period or distributed throughout the year, on a flat-topped hill at Khandalla, subject to a rainfall of about 200 inches between May and October, or on the seashore with water always a few feet below the surface, it appears to thrive equally well. The field on which this plantation of Casuarinas is made having been leveled, the depth of soil on the upper side was six inches, on the lower side six feet, but a water-course runs along the upper side, and there is a gradual decrease in the size of the trees from the water-course downwards, although the depth of soil increases in the same direction.

The plantation is utilized as a nursery, the light feathery branchlets breaking the rays of the sun, yet admitting abundant light, tend to make it cool in the hot season and equable during the cold season when the range of temperature on exposed places is great.

The trees were originally planted 5 feet, and have been thinned out to 15 feet apart. Beer barrels have hitherto been so cheap in India that there has been little inducement to pre-

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pare the familiar plant boxes of European gardens ; but since brewing has been established in the plains, it is evident that the price of beer barrels must rise above their value as plant tubs. This is not much to be regretted, because those square plant boxes which can easily be taken in pieces and are held together by iron bolts are greatly superior to the old tubs in convenience in examining the roots of a plant and in durability.

CLASSIFICATION.

PLANTS are arranged by botanists in two great divisions called sub-kingdoms; one (Phanerogamia)[*] includes all plants commonly known as flowering plants, in which the sexual arrangement is apparent, with cypress, pine, and casuarina trees, and grasses that have minute flowers, or in which the flowers have not bright colours. The other class (Cryptogamia)[†] includes those in which the sexual arrangement is not so clearly apparent, viz., ferns, mosses, mushrooms, seaweeds, and other allied plants.

Phanerogamia is divided into two classes. Plants of one class are called Dicotyledons,[‡] from the presence in the seed of generally two seed leaves, as in the pea, the castor-oil seed, or cotton seed. These plants have the veins of the leaves forming an irregular network, so that if a leaf is torn the edge is irregular. The flowers have the various whorls of organs generally in fours or fives; the wood is formed in bundles radiating from a central pith, and increasing in size by additions formed between the wood and bark (cambium layer), and the bark is separable. This may be seen easily by cutting across the stem of *tondlee (Coccinia Indica)* or *bhokur (Cordia latifolia)*. With the aid of a lens it may be seen in a great number of trees with net-veined leaves, and should be compared with the end of a sugarcane or a bamboo, which belong to the other class, called Monocotyledons, from the presence of one leaf only in the seed. The leaves of this class have the veins running parallel, as may be easily seen in a banana leaf, sugarcane, or any other grass. The parts of the flowers are in threes; for this character examine *Gulchuboo (Polianthes tuberosa)*, or any of the plants usually called lilies and the wood is formed in wire-like bundles, which soon discontinue to grow in thickness. These bundles are easily distinguished in the stem of the cocoanut or *mhad*, in the sugarcane, and the bamboo. As these divisions are natural groups in which the individual members resemble each other in many points yet differ in some respects, no single character or mark can be given by which they can be absolutely distinguished.

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[*] Gr. *phaneros*, visible, *gamos*, sexual union.

[†] Gr. *kruptos*, hidden.

[‡] Gr. *di*, two, *kotuledons*, hollow cups = seed leaves.

In many Dicotyledons one of the floral envelopes is suppressed, the calyx only being left to enclose the essential organs. In this case it is often coloured, and resembles the ordinary corolla (petaloid). Example: *Gulabas (Mirabilis jalapa)*. The suppression of one of the floral envelopes is made use of for dividing the large class of Dicotyledons into two convenient groups, one called Monochlamydeæ,* in which the flower has only one covering, often minute, sometimes wanting, and the other, Dichlamydeæ,† in which the two coverings are generally developed. Dichlamydeæ is a large sub-class, and is again divided into groups, in which the flowers have the petals free, as in the poppy or *peela dhatura (Polypetalæ)*,‡ or joined as in *sagurgota* or *bowric (Gamopetalæ)*.§

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* Gr. *monos*, one; *chlamus*, a cloak.

† Gr. *dis*, twice.

‡ Gr. *poly*, many; *petalon*, a leaf.

§ Gr. *gamos*, marriage, union; *petalon*, a leaf.

NOTES ON GARDEN PLANTS.

ARRANGED IN NATURAL ORDER.

WE now begin our notes on garden plants with a division of the tribe Polypetalæ called Thalamifloræ,[*] in which the various whorls of the flowers are not adherent to each other, and the parts (sepals, petals) of the whorls do not generally cohere; for illustration examine a poppy *(Papaver somniferum)*; the prickly poppy, or as it is called in the vernacular *peela dhatura (Argemone Mexicana)*; the flower of *chirati (Tribulus terrestris)*; or of mustard, or any kind of *bendi*. In the latter, however, there is cohesion between the sepals and between the stamens, and the corolla is joined to the tube formed by the united stalks (filaments) of the stamens.

RANUNCULACEÆ.

The buttercup or crowfoot family so common in English meadows, has very few representatives in our gardens; they are herbs with alternate leaves, often much divided, and shrubs with opposite simple or divided leaves and very showy flowers.

Acrid properties characterise the order; in Aconite very poisonous.

LARKSPUR, *Delphinium*[†] *ajacis*,[‡]

Is an annual with much divided alternate leaves and showy racemes of blue flowers. If sown in October Larkspur makes a showy bed from January to April. A deep friable soil is required, with regular watering sufficient to keep the soil moist. It is advisable to sow where the plants are wanted to bloom and thin out, instead of transplanting.

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[*] L. *thalamus*, a receptacle; *flos*, a flower.

[†] Delphinium. The Greek name used by Dioscorides.

[‡] *Ajacis*. The specific name was given from the supposition that the letters A, J, A were to be seen in the lines on the petals

DILLENIACEÆ.*

A small group of trees or shrubs, sometimes climbing. The garden members are trees with grand, alternate, exstipulate leaves, having conpsicuous lateral parallel nerves and fruit enclosed in five thickened sepals.

DILLENIA INDICA, *Mota Kurmal, Uva Chitta, Chalta,* often called *Dillenia speciosa,*

Is a very beautiful tree of a spreading habit with bright green leaves having conspicuous lateral nerves ending in a tooth at the margin and very fragrant pure white flowers 9 inches in diameter followed by fruit enclosed in five thickened persistent sepals forming a ball the size of the fist. The sepals have an agreeable acidity and are used in curries.

This very beautiful tree thrives in moist districts, such as its natural habitat, the forests of the Dang country and of the Circar mountains, and in the Botanical Garden at Calcutta. In dry districts it thrives in sheltered positions in a rich deep irrigated soil and is well worthy of care for its magnificent flowers. It is propagated by seed, which may be obtained from Calcutta seedsmen.

DILLENIA PENTAGYNA †, *Kurmal, Rowadan.*

This species is worthy of cultivation as a foliage plant in gardens where a moist climate obtains. In the Dang forests its leaves may be seen four feet in length by one in breadth, richly copper-coloured and hairy while young, and crowning a simple straight stem. Its flowers appear in the hot season and are yellow and showy; its fruit is about half an inch in diameter.

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* *Dilleniaceæ,* from the genus *Dillenia,* named in honour of John James Dillenius, Professor of Botany at Oxford, died 1747.

† *Pentagyna,* having five carpels.

CLEMATIS[*]

Are climbing shrubs, with opposite leaves, a bright-coloured calyx, and no corolla.

Hybrid varieties, with blue, white, and crimson flowers, are frequently brought from temperate countries, and are much prized in our gardens. The cultivation required is moderately rich soil with perfect drainage, abundant water while growing fast, which is generally during our hottest months, and very little after the growth is ripened. *Propagate by inarching on to the root of* an indigenous sort, of which one of the best is

CLEMATIS TRILOBA,[†] *Mor Vale*,

A native of the Deccan, with simple or three-lobed leaves and sweet-smelling white flowers, nearly as large as a rupee. Suitable for covering an arch where the flowers are within reach of the hand. Propagated by seed and layering. A really charming climber, flowering about September.

RANUNCULUS[‡] ASIATICA.[§]

Roots of this pretty plant are often imported during the cold season and flower at the beginning of the hot weather, but give way to the heat as the season advances.

MAGNOLIACEÆ.[||]

A small group of trees or shrubs, much prized for their beautiful and sweet-scented flowers.

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[*] *Clematis*, from *Kleme*, a vine branch.

[†] *Triloba*, three-lobed.

[‡] *Ranunculus*, a little frog, applied by Pliny to species which abound in wet places.

[§] *Asiatica*, from Asia.

[||] *Magnoliaceæ*, from the genus Magnolia, named in honour of Pierre Magnol, Prefect of the Botanical Garden at Montpellier, died 1715.

The indigenous members affect the cooler parts of India and specially thrive at an altitude of 4,000 feet. All need a deep moist soil. The species are propagated by seeds or layers and the varieties by grafting.

MAGNOLIA GRANDIFLORA*

Is in our gardens a delicate small tree, of very slow growth, with broad entire shining leaves, and producing very large sweet-scented white flowers in May. It thrives in a thin shade conservatory or in the open ground in rich deep soil regularly watered, and is propagated by seeds obtained from its natural habitat, Florida, or by layering in the form called *gootee*, in which the branch is slit open from a bud outwards about 2 inches. A small stone is inserted and some fine sandy soil tied round the branch in sackcloth, which is kept moist by water dripping from a pot suspended above it. On being removed the layers must be kept in a close moist frame until established.

MAGNOLIA CONSPICUA†

Grows with the same treatment as is advised for the above species, but its foliage is not as handsome in this climate.
It is propagated by layering.

TALAUMA‡ PUMILA§.

A small shrub with oblong leaves; often disfigured by decayed portions and very sweet-scented globular flowers. It thrives with slight shade, a free admixture of potherds in the soil, and needs to be planted or potted very firmly, so as to reduce the danger of the soil becoming sour.

* *Grandiflora*, large flowered.

† *Conspicua*, remarkable, conspicuous.

‡ *Talauma*, derivation obscure.

§ *Pumila*, from *pumilio*, a dwarf.

MICHELIA* CHAMPACA, *Sone Champa, Champaka.*

A tree much resembling the mango in habit and the shape of its leaves with foliage of a dull green hue and sweet-scented pale-yellow flowers, produced in great numbers followed by one-celled fruits, which soon open and permit the seeds to hang out by long funicular cords.

This tree thrives throughout India in ordinary garden soil of considerable depth watered occasionally. It is propagated by seed, which is procurable at Panchgani, Abu, and other stations of similar altitude (nearly 4,000 feet). Some nearly white-flowered varieties are in cultivation, which are propagated by grafting to seedling plants.

ANONACEÆ,† *The Custard Apple Family.*

This group of plants are trees or shrubs, sometimes climbing, with alternate exstipulate leaves and flowers with fleshy petals, often of a pale-yellow colour and having an agreeable perfume. A deep stony soil is generally suitable, but alluvial soil produces good specimens and fresh seeds are necessary for propagation.

ANONA SQUAMOSA,‡ *Custard Apple, Ata, Sitaphul.*

A deep, very stony, soil with perfect drainage enriched with decayed town sweepings are the conditions enjoyed by this hardy fruit tree. In a soil of this description, pits two feet deep and ten feet apart each way should be dug and filled with one-half surface soil and one-half decayed sweepingsl well mixed and heaped up six inches to allow for settling in these holes. Several fresh seeds should be sown in each pit, and the intervening space cultivated with potatoes or any other suitable crop.

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* *Michelia,* after Peitro Antonio Michele, a celebrated Florentine botanist, 1679-1737

† *Anonaceæ,* from the typical genus *Anona,* probably from *Noona,* the Bengalee name of *Anona reticulata.* ‡ *Squamosa,* scaly.

Superior varieties of this fruit are really delicious, and even the common varieties bear useful fruit, procurable in seasons of drought when little else is available. If people who are fortunate enough to possess a custard apple tree of high character would communicate with Mr. Woodrow at Poona, arrangements for grafting it could be made, which would be advantageous to all concerned.

ANONA RETICULATA,* *Bull's Heart, Ramphul, Noona,*
With large, fleshy, smooth, heart-shaped fruit, and

ANONA MURICATA, *The Sour Sop,*

Resemble a large custard apple, with soft thorn-like points to each of the pips; both of the above are raised from fresh seeds sown where the tree is wanted. The fruit is nutritious but insipid.

POLYALTHIA† LONGIFOLIA,‡ which is known as *Guatteria, longifolia, Asaphula, Asok, Rat, Devadari,*

Is a very beautiful tree, with long lance-shaped shining leaves, wavy at the edges, and greenish star-like flowers appearing at the beginning of the rainy season. It enjoys a deep stony soil, especially the *débris* of a building, and looks particularly well planted in streets. As this tree does not transplant well, pits three feet deep should be prepared, filled with loose open soil enriched with well-decayed town sweepings and several *quite fresh* seeds planted; in such circumstances it shoots up rapidly, and needs little attention after the first year or two. The seed ripens about the end of July, and can be obtained very cheaply at Poona.

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* *Reticulata*, netted, referring to the surface of the fruit.

† *Polyalthia.—Poly,* much; *althecis*, healthy, alluding to supposed properties of the tree.

‡ *Longifolia,* having long leaves.

ARTABOTRYS* ODORATISSIMUS, *Hara Champa,*

Is a climbing shrub, with bright green leaves and thick fleshy flowers, green in colour until ripe, when they become yellow, and emit a strong perfume resembling rotten apples. This climber can easily be trained in an umbrella-like form, and enjoys a full supply of lime rubbish and other open material in the soil; propagated by layering or seeds.

UNONA DISCOLOR.

A small spreading shrub, with pale yellow odorous flowers. Propagated by layers.

MENISPERMACEÆ†

Is a small group of plants, chiefly climbing shrubs, and not of great importance in gardens, but

TINOSPORA ‡ CORDIFOLIA, *Goolwail, Gulancha,*

Is a valuable medicinal plant, having tonic, antiperiodic, and diuretic properties. It is a twining shrub with scabrous corky bark and broad cordate leaves. This plant is so retentive of life that if a branch is thrown on to a fence during the rainy season roots will be produced which will reach the ground and the cutting will flourish.

The male and female flowers are on separate plants, *diœcious,* and the stem is useful in teaching botany from the large size of its parts, making its structure clearly apparent.

ANAMIRTA COCCULUS, § the source of the seed, *Cocculus Indicus, Kakmari-ka-benje,*

Resembles *Tinospora cordifolia* and its cultivation is nearly similar.

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* *Artabotrys—Artao,* to suspend; *botrys,* a bunch. The peduncle has a curious hook, which enables it to suspend the bunch of fruit.

† *Menispermaceæ—Mene,* the moon, and *sperma,* a seed, alluding to the half-moon-shaped seed which some of the species produce.

‡ *Tinospora,* wormseed; *cordifolia,* having heart-shaped leaves.

§ *Anamirta* (probably from the Sanskrit word for unfriendly, the popular character of the plant) *cocculus,* from the resemblance in colour of the berries to the *coccus,* cochineal.

BERBERIDEÆ.

A group of shrubby, glabrous plants abundant on our mountains above 5,000 feet altitude and in such places are useful as fences from the spines which arm the leaves.

BERBERIS* ASIATICA

Forms a very pretty bush with 3 to 5-fold strong spinous shining leaves—spinous on the margin and abundant small pure yellow flowers. It thrives finely in a cool sheltered position in the plains.

NYMPHÆACEÆ.

This charming group of plants is of easy culture and well repays attention. A tank with varying depths of water, arranged so that during the rainy season it may remain full and during the remainder of the year one part may contain water and another remain dry, is desirable for growing a large collection, because some require water continuously and others thrive better when dried up during the dry season of the year. Propagation is generally effected by seed. The soil must be freely manured, unless it is in a position where it receives the washings from extensive fields. For manuring water plants, old well decayed manure or bones dissolved in sulphuric acid and saltpetre may be thrown into the water in small quantities at a time. Weeding must be carefully attended to, because water-weeds grow perhaps more rapidly than land weeds.

VICTORIA† REGIA.‡

This is fitly named the queen of water lilies. It is an extremely large and wonderfully interesting water lily (species of *Kummel*), a native of the Amazon River.

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* *Berberis*, derivation obscure.

† *Victoria*, named after the Queen of the British Isles and Empress of India.

‡ *Regia*, royal.

Its circular floating leaves have been known to reach 12 feet in width, with the edge turned up a few inches like an immense tray. This great expanse of leaf is protected on the lower side by spines and supported by a wonderful system of girder-like supports strengthened by cross girders, which form strong cells, increasing the buoyancy of the leaf to such an extent that in several experiments it has been found to bear the weight of a man easily. The flowers of this grand plant are proportionate to the size of the leaf and have a sweet perfume which scents the breeze to a considerable distance. The plant has been grown near Madras for many years, but further north much success was not met with; the cold during the month of January proving fatal at Poona, until Mr. Storey at Odeypore treated the plant as an annual, and showed that it could be grown with success as far north as that station, and consequently it may be grown in any part of the Indian plains.

The important point appears to be to get the seed to germinate during April or May and to provide a very rich soil. Two cart-loads of good old manure should be mixed with four loads of friable loam from the surface of a river bank and stored in a moist pit during six months to permit the thorough reaction of the soil and manure. Several seeds being sown in a basket of similar soil, it should be placed in a larger basket standing in a tank, so that the edge of the outer basket may remain above the surface and exclude fish. It is doubtful whether fish eat the young plants, but they disappear in a remarkable way during the first week of growth if a guard of this kind is not prepared. Meanwhile, the tank in which the plant is to be grown should be arranged: in size it should be 80 feet wide to permit of full development and in depth 4 feet in the centre; it may gradually be reduced to 1 foot at the sides. The prepared soil should be placed in the centre, so that, when settled down and the water raised to its full height, between two and three feet of water may cover the soil. About a month after the seed has germinated the leaves will be six inches wide and the basket guard for the infantile Victoria unnecessary. The plant should then be gently moved to its final quarters, where it may be planted in the heap of rich soil and the water kept just deep enough to permit the leaves to float on the surface. When it starts into growth, if successful, its progress is very rapid, and the depth of the water may be gradually increased until the overflow shows a depth of about 3 feet over the crown of the plant. The water must not be allowed to stagnate, therefore a little paddle wheel is generally fixed so that the water-supply may play upon it and keep the surface in motion.

ANOTHER MODE OF PREPARATION FOR GROWING THE VICTORIA.

I have grown a Victoria at Poona on a system differing much from that described above and notes on the matter may be useful. Being unexpectedly presented with Victoria seeds by Mr. Storey, of the Oodeypore gardens, at a time when suitably prepared soil for growing the great water lily was not available, common garden soil was used and manured as follows:—A jar of sulphuric acid, a cart-load of bones, and 30 lbs. weight of saltpetre was purchased. The sulphuric acid was diluted with twice its volume of water and a number of jars made half full. The bones were first soaked in water, then put into the diluted acid, and in a few hours were decomposed into a whitish paste, which was monocalcic phosphate of lime. About 4 lbs. weight of this and 2 lbs. weight of saltpetre *(sorakar)* was thrown into the water daily, and the result was very rapid growth of the Victoria. This system is not to be recommended generally, because the manure used is so powerful that much experience is required for its successful application, but some others may find themselves in the same initial position and benefit by the experience given.

NELUMBIUM[*] SPECIOSUM.[†] The Lotus, *Kummul, Kudum, Pudma.*

In tanks with a muddy bottom, little overflow, and the loss by evaporation made up by supplies of fresh unfiltered water this grand water-lily is of easy culture. It is too well known to need description. The colour of the flower in Western India is generally bright rosy and in Coromandel districts pure white is to be found, and I am informed that near Goa pale golden flowers are produced. Whether this is a variety of our Pudma or the yellow Nelumbium of California is doubtful. Propagation is most easily effected by seed, which should not be more than a month out of water. Tubers which form on the creeping stem may also be used for propagation, but fresh seeds are more reliable.

NYMPHÆA[‡] LOTUS.

With flowers varying from pure white to bright red, easily distinguished from the following species by the absence of appendages on the anthers. This species grows freely in tanks of sweet water either when the water is permanent or if allowed to dry up during the hot season. It is propagated by seeds, which are minute and not reliable in germination, or by tubers found in the mud of water-holes where the plants have been seen growing. To transplant this beautiful water-lily to the garden it is advisable to mark the spot they are seen growing in, and dig up the tubers during the following hot season. Water lilies transplanted while in flower seldom thrive.

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[*] *Nelumbium*, from *nelumbo*, the name used in Ceylon.

[†] *Speciosum*, showy.

[‡] *Nymphæa*, from *nymphe*, a water nymph.

NYMPHÆA STELLATA

Has most frequently blue flowers, but a variety of shades are to be found. Its most easy distinguishing character is the long appendages to the anthers, which are wanting in *Nymphæa lotus*. Its treatment is exactly similar.

PAPAVERACEÆ, *The Poppy Family.*

The plants of this family are herbs with alternate usually sessile leaves, showy flowers, and oily seeds borne on the walls, or on plates extending inwards from the walls of the capsule. The roots are generally strong and deep-searching with few fibres, and the plants do not bear transplanting well. Propagation is effected by seed.

PAPAVER* ORIENTALE, *The Garden Poppy, Lala.*

A showy herb with much divided leaves and large scarlet flowers, having a dark spot at the base of each petal. It enjoys a deep sandy soil manured with old dung or leaf mould. The seed should be sown in October or November, where the plants are wanted to bloom and thinned out to six inches apart.

PAPAVER BRACTEATUM †

Is a variety of the above with bracts at the base of the flower largely developed and is treated similarly.

PAPAVER HOOKERI ‡

Is a large species, forming a bushy herb 3 to 4 feet in height, very gay, with numerous large flowers varying from rose to deep scarlet. In treatment it is similar to the other species, but must be thinned out more or reared with great care in a bed and potted separately when young and planted out 2 feet apart when well established.

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* *Papaver*, the old Latin name used by Pliny.

† *Bracteatum*, having small modified leaves beneath the flower.

‡ *Hookeri*, after Sir Joseph Hooker.

PAPAVER SOMNIFERUM,* *The Opium Poppy, Afim-ke-Jhar, Khus-Khus, Post.*

A large poppy, generally white, but to be found of the most beautiful mixture of rose, lilac, or violet and white. The source of the drug, opium, which is the dried sap obtained by scratching the immature capsule with little knives, that are fastened together in fours. A rich deep soil as open and friable as possible is desirable. The seed should be sown where the plants are wanted to bloom, and look to advantage in masses.

ARGEMONE† MEXICANA, *Peela Dhatura.*

The prickly poppy, a common weed, is very useful for acquiring a knowledge of the family. It has 3 sepals, which fall off as the flower opens, 6 petals crumpled in the bud, and the ovary shows the ovules seated on its walls *(parietal placentation).* White varieties are cultivated in Europe for ornament.

ESCHOLTZIA‡ CALIFORNICA.

A very ornamental annual with large bright yellow flowers and much divided leaves. Sow in sandy loam about September or October on the spot where the plants are wanted to bloom.

BOCCONIA§ CORDATA.

A handsome foliage plant for a light conservatory. The leaves are alternate stalked, large, cordate, lobed, and of a pale green colour. The flowers are not conspicuous. Propagate by seeds.

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* *Somniferum*, sleep-producing.

† *Argemone.—Argema*, cataract of the eye.

‡ *Escholtzia*, after Escholtz, a celebrated Naturalist, 1793-1831.

§ *Bocconia*, after Paolo Bocconi, M.D., a Sicilian Botanist; *Cordata*, heart-shaped.

FUMARIACEÆ.*

This is a group of annual or perennial herbs, with watery juice; the leaves are usually divided, the segments not jointed, which occur abundantly in temperate Himalaya. A very beautiful member is a plant of Japan and Siberia, much cultivated in Europe, viz:

DICENTRA† SPECTABILIS,‡

Which will grow at hill stations if well established plants in a resting state are imported from Europe, might be hybridised with *Dicentra Roylei* or some other indigenous species.

CRUCIFERÆ,§ *The Mustard Cabbage Family,*

Is so called from the cross-like arrangement of the four petals, and is a very important group from the number of wholesome esculents it includes. Of these, cauliflower, cabbage, and radish are familiar examples. Although much cultivated in India, the family generally affects temperate regions, and is valued for the nutritive and anti-scorbutic properties of many of its members.

This family as a rule needs a very rich friable soil with abundant decayed cowdung as manure, and are indifferent to a considerable quantity of salt in the soil. Being temperate climate plants, nearly all of them thrive better if sown when the rainy season is nearly over, but the season may be prolonged till May by planting on the northern side of a high tree, where abundant light accompanies partial shade at midday. Seed is the only means of propagation generally used, but valuable varieties are sometimes increased by cuttings and division of the root-stock. In this family special attention should be given to the system of defeating insect enemies given on page 77.

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* *Fumariaceæ*, from the genus Fumaria; *fumas*, smoke, in allusion to the disagreeable smell.

† *Dicentra—Dis*, twice; *kentron*, a spur.

‡ *Spectabilis*, remarkable.

§ *Cruciferæ*, cross-bearing, in allusion to the arrangements of the petals.

BRASSICA* OLERACEA, *Cabbage, Cobee.*

Of this wholesome vegetable there are several well-marked varieties, distinguished by the size, shape, and colour of the conglomerated leaves, "heads."

If the rainfall is not over 50 inches annually, the seed may be sown about the middle of August for the main crop; if sown earlier, the crop has many insect enemies to contend with, which weaken the seedlings, unless the weather proves exceptionally favourable; if the rainfall is heavy, defer sowing till the middle of September, and see that a well-drained spot is selected for the seed-bed. Make a small fresh sowing twice a month till November to prolong the season.

The seed should be sown on soil that has been well manured for the previous crop, with the addition of a small quantity of thoroughly-decayed manure worked into it.

Sow in lines six inches apart, half an ounce of seed to 100 square feet, and give a thorough watering. Good seed will germinate within ten days. When the plants are well up, thin out carefully, so that there may be no crowding to make the plants weakly. When the seedlings are about four inches high see that the soil is in a moist but not wet condition; then lift carefully so that some soil may adhere to the roots, and transplant to the permanent quarters, which must be a first-class soil, well worked and enriched with a liberal supply of decayed cowdung or town sweepings: poudrette is also excellent if there is no stint of water and the drainage is good. The quantity of manure to be given depends so much on local circumstances that no distinct rule can be laid down, but there is little danger of giving this crop too much manure if it is well mixed with the soil. An average of one inch in depth of decayed cowdung or poudrette is a sufficient dressing for growing cabbage and other strong growing crops with abundant irrigation. The cabbage is not a deep-rooting plant in India, therefore irrigation must be provided at short intervals—once in four days for soils of average retentive quality. When the plants are young the irrigation should be supplemented by an evening shower from a watering pot at least once in two days; and when well established, a soaking of liquid manure at the root once a week is desirable.

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* *Brassica*, from *bresci*, the old Saxon for cabbage.

The distance apart the plants should be put in depends on the size the variety attains; 2 feet for small and 2½ feet apart in both directions for large varieties are suitable distances.

If large well filled heads are expected the hoe must be kept at work stirring and breaking the surface as often as possible—at least once in ten days is necessary—until the plants cover the ground.

The root of the cabbage being small in proportion to the leaves and not adapted for wide foraging, a soil in the best possible condition is necessary, and therefore it should not have borne a crop of any other *Cruciferæ* for a year previous to the planting of cabbage.

If greenfly abounds water the plants gently with a watering pot and dust them with wood-ashes. Allow the ashes to remain during one night and wash them off by a smart shower from the watering pot, and repeat the dusting of ashes again in the evening. In dusting on the ashes, the hand should be kept low so as to get as much as possible on the lower sides of the leaves. This plan keeps down the pest to some extent: more than this it is difficult to attain without injury to the plants. Many attempts have been made to grow cabbage seed in India, and in the Northern Provinces some degree of success has been met with—in so far as the production of seed is concerned, but not as a commercial speculation. This is not greatly to be regretted, because hereditary influence is not strong in cabbage. A first class variety removed to a different soil and climate soon loses the characteristics for which it is valued, and as the seed is not heavy or costly, it is better to get yearly supplies from a merchant whose business it is to know where the best seed is procurable than to try to save seed in India. The price of seed in our large cities is rarely more than 8 annas per oz.

The following sorts are of good useful quality :—

SUGARLOAF CABBAGE, *Narclee Cobee.*

An upright-growing sort giving small early heads.

EARLY YORK CABBAGE.

A tender white variety of medium size.

DWARF DRUMHEAD CABBAGE, *Bopalee Cobee.*

A large sort giving very firm flat heads, which bear carriage well, and is a favourite with market gardeners. This variety appears to me more fit for table in India than it usually is in England, where it is considered somewhat coarse in flavour.

RED DUTCH CABBAGE, *Lal Cobee.*

A small red sort used for pickling and in French cookery. It should be sown in the beginning of the cold season, as it does not stand heat well.

WINNINGSTADT and MADGEBOURG CABBAGE

Are large free-growing kinds of great merit.

SAVOYS

Are varieties of cabbage with leaves which rise between the principal veins giving the plant a puckered *bullate* appearance.

BORECOLE

Is, like the cabbage, a variety of *Brassica oleracea*, but differs in retaining a natural development of the leaves and has greater power to resist cold, and the leaves are scarcely esculent until frost-bitten; therefore its cultivation in India is not profitable.

KNOL-KOHL OR KOHL-RABI

Is another variety of *Brassica oleracea* which to a great extent replaces the turnip in this country as it endures heat better than that esculent. Let the soil be thoroughly enriched with manure, as detailed for cabbage, and in the Deccan sow any time from the beginning of May to the beginning of January; the early-sown crop should be shaded slightly till the rains set in, and a fresh sowing made once in ten days. In districts with rainfall over 40 inches sow on well-raised beds from August till the rainy season is over; afterwards continue sowing till January on ridges one foot apart, so that the water may run between them. It is not advisable to transplant knol-kohl because the check the plant receives increases the woody fibre.

Early White Vienna and Green Top White are the best sorts.

BRUSSELS SPROUT,

A variety of cabbage with a long stem crowned by a small head of blistered leaves. From the stem small shoots (sprouts) appear, which are a delicate vegetable. The cultivation is exactly as detailed for cabbage, but the sprouts should be gathered and used when between two and three inches long.

CAULIFLOWER, *Phool Cobee.*

This is universally considered the most delicious of the varieties of *Brassica oleracea.* The part usually eaten is a malformation of the infloresence, which occurs during the early part of its growth, forming a white conglomeration of imperfect buds and a few of the tender leaves surrounding the head.

Cauliflower being a delicate plant always needs great care and attention in its cultivation, but much less care is necessary in this country than in Europe. The soil most suitable is a rich friable loam, such as occurs in the black soil of the Deccan, the alluvial tracts in the basin of the Ganges or Nerbudda. Thorough working of the soil is necessary, and in stations where the market price of cauliflower is usually over 4 annas per head, as is the case in many parts of Southern India, the crop is well worth extra care in the preparation of the soil. This process should be begun shortly after the rains, when the soil is easily ploughed or dug. It should then be turned up roughly to a depth of a foot or fifteen inches. A month later the clods should be broken with the mallet or clod-crusher, and the plough put through the ground a second time. When the soil has weathered a few weeks, the scarifier or cultivator should be run over it once monthly until May. At that time good decayed cow-dung or poudrette should be spread one inch deep, and any close-growing crop which is not valuable, such as *sunn, tag, chanamoo, Crotolaria juncea*, should be sown to keep down weeds and encourage the formation of nitric acid in the soil, which has been proved to be effected to a greater extent under a crop than on bare soil. During dry weather in August the crop should be pulled up and the ground ploughed or dug and the crop buried in the trenches to act as green manure and the land prepared for irrigation.

The seed-bed should be prepared by thorough digging and mixing about an inch in depth of old manure; wood ashes and decayed sweepings having a quantity of goat or sheep dung in it is well suited for the seed-bed at this season. Cowdung is apt to have the larva of the dung beetle in it—a very large caterpillar, which destroys young plants by eating through the stem underground. The bed having been thoroughly watered the seed may be sown broadcast or in lines, and covered with a quarter of an inch of fine dry sandy soil and shaded from bright sunshine. When the seedlings appear gradually remove the shade. The most convenient form of bed is not more than 4 feet in width, the length being sufficient for the ground to be planted. One ounce of seed is sufficient for a bed of 50 square feet, which will give sufficient plants for an acre if the seed is good. Sowing should be made once in ten days from the middle of August till the end of September. If the garden has been neglected or the district remarkable for the quantity of grubs that yearly come out in August, spread a considerable part of the garden with a thick coating of stable litter or dry leaves and burn it, prepare the seed-bed in the middle of the burned space and soak two lbs. of saltpetre in water for 100 square feet and water the bed with it at least for two weeks before sowing the seed. The seedlings having about five leaves and the ground to plant being ready, on a cloudy day lift the seedlings gently and plant out 2½ feet apart in both distances. If bright sunshine comes out shade the newly moved plants with broad leaves and water daily with a watering pot for a few days, besides irrigating sufficiently to keep the soil moist. Afterwards hoeing and picking grubs and replacing losses from the seed-bed must be attended to.

The selection of sorts is a serious matter in cauliflower, because many sorts grow to leaves only in some climates and great loss has been met with by some people in consequence of getting the wrong variety. A variety known to English seedsmen as large Asiatic has established itself in the Northern Provinces, where a good head of cauliflower is procurable in December for $\frac{1}{2}$ anna. In Bombay the same would cost ten times that sum. The seed of this variety is remarkably cheap in the districts it bears seed in. From Shajehanpore I bought large quantities at Rs. 2 per lb., while the price of seed from England was Rs. 2 per ounce. This sort is perfectly reliable when properly cultivated, but it is considered inferior in flavour and delicacy to English sorts, and its season is very short. It appears to run to seed when January comes, at whatever time it may have been sown, while English varieties come into use from the beginning of December to the end of February according to the date of sowing.

Among European varieties success will generally be met with by sowing Early London and Walchern. The different Giant and Mammoth varieties advertised in Seedsmen's Catalogues should be grown as extras, and if one is found to suit the soil and climate of a particular station it may be grown more extensively afterwards; my experience with those varieties has not been happy. The price of European varieties in the catalogues of the principal seedsmen in India, whose addressses are to be found in the advertising columns, is about Rs. 2 per oz.

Insect enemies are the same as the cabbage, and may be treated as detailed under that head, with special attention to the system of defeating injurious insects given at page 77.

BROCCOLI

Is a variety of cabbage having a fleshy edible head like cauliflower, but thriving with much less heat than cauliflower requires. Its cultivation is the same as that of cauliflower, and it is seldom grown where that delicate vegetable thrives under the same conditions. The seed is sold in Bombay at 8 annas per oz.

BRUSSELS SPROUTS,

A variety of cabbage with the leaves blistered and the stem covered with small close sprouts. Its cultivation is the same as that of cabbage. Seed is sold in Bombay at 8 annas per oz.

NASTURTIUM* OFFICINALE,† *The Water Cress.*

Where a gently running stream of water is to be found, water cress may be cultivated without any trouble. Since the irrigation canals were opened near Poona the beds of several of the streams that flow through the city have become filled with this valuable esculent, but it appears the people do not yet know its value as food. At Manchester this herb is sold at twice the price of bread, and in London the quantity sold annually costs 30 lacs of rupees.

To cultivate water cress, cuttings should be planted where the water is not more than four inches deep, and a stone placed on the cutting to keep it in place until it takes root. Fresh plantations need to be made annually.

Nasturtium, the plant which bears this name in gardens, will be found under TROPÆOLUM.

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* *Nasturtium*, an old Latin name used by Pliny, derived from *nasus*, the nose; *tortus*, twisted.

† *Officinale*, sold in shops.

BRASSICA CAMPESTRIS RAPA, *Turnip, Sagalum, Shulgam.*

Let the soil be well worked a foot deep at least, and manured with old manure. Sow in lines one foot apart: in the dry districts from the beginning of August fortnightly, in the districts with heavy rainfall from the end of September, and water sufficiently to keep the soil moist. Transplanting is not desirable. During the young stage this plant has a host of enemies, but in this country *aphis* is the chief one, and it may be combated by dusting with wood-ashes and the use of the rose watering pot sufficiently to let the plant attain strength.

If the garden is an old one with numerous weeds in the neighbourhood, the system of preventing insects by covering the ground with rubbish and burning it before sowing, noted on page 77, will be found suitable for this crop.

The WHITE STONE, YELLOW MALTA, and ORANGE JELLY are fine garden varieties.

RAPHANUS* SATIVUS,† *Radish, Moola.*

To obtain either the European or Indian varieties of this valuable esculent in good condition a well-manured soil is necessary. In the dry districts the seed should be sown once weekly from the beginning of the rainy season till the end of December. Where the rainfall is heavy, sowing should be begun when the rainy season is three parts over. The roots are good to eat only when they have been grown rapidly and without a check from weather or insects. In favourable circumstances the European sorts come to perfection in this country in three weeks and the native sorts, which are much larger and white-coloured, between six weeks and two

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Raphanus, the old Greek name used by Theophrastus.

Sativus, that which is sown or planted.

months. Select a position slightly shaded at midday and keep it moist. Of European varieties the FRENCH BREAKFAST, RED TURNIP-ROOTED, and LONG SCARLET are favourite sorts.

LEPIDIUM* SATIVUM, *Cress, Haliva, Halim.*

A small annual plant, cultivated as a salad. To obtain cress in good condition it should be sown on a friable rich soil, previously thoroughly watered and kept shaded, so that little watering may be necessary and the plants grown as tender as possible; cut with scissors near the surface of the ground; a week after sowing it should be ready to cut, and a fresh sowing should be made every three days.

Cress is grown as a field crop in some parts of Guzerat and Deccan for its seed, which is considered a tonic and alterative, therefore the seed is generally cheap and plentiful in the bazaar. A very pretty way to grow this plant is this. Take a porous water goblet and smear it carefully with a mixture of soil, manure, and water. Then dry it in the sun to cause it to adhere; then moisten and sprinkle with cress seed, beating the seed into the soil gently. Fill the goblet with water and let it stand in a saucer. The water will leak through the goblet, and if kept in a diffused light the seed germinates and forms a pretty cress bed fit to decorate a breakfast table.

SINAPIS† NIGRA,‡ *Mustard, Mohria, Rai,*

When grown for salad, should be treated exactly as detailed for cress.

The sort generally used for salad in Europe has pale yellow seed, but the dark seed, which is plentiful and very cheap in the bazar, makes as good salad as the other if grown as detailed for cress.

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* *Lepidium*, Greek name used by Dioscorides, diminutive of *lepis*, a scale, and probably alludes to the form of the pods.

† *Sinapis*, the old Greek *sinapi*, used by Theophrastus for mustard.

‡ *Nigra*, black.

IBERIS[*] UMBELLATA,[†] *Candytuft,*

Is a nice-looking annual of easy culture, with purple flowers growing 8 or 10 inches high. It may be sown from July to October in a deep loose soil and not transplanted. Water once in three days in sufficient quantity to keep the soil moist.

IBERIS ODORATA,[‡] *Sweet Candytuft,*

A pretty, dwarf-growing, white-flowered, sweet-smelling annual, which in dry districts may be sown at the beginning of July in deep friable soil. It will flower during September or if sown in November will bloom in January and February.

MATHIOLA[§] ANNUA, *Ten-week Stock,*

If sown at the beginning of the cold season may be had in flower by February. It is advisable to sow in good-sized pots, or in beds of deep friable soil, and not to transplant.

MALCOLMIA[||] MARITIMA, *Virginian Stock,*

A very pretty annual suitable for small beds or for edgings. It thrives in stations of Northern India if sown in October.

CAPPARIDACEÆ,[¶] *The Caper Bush Family,*

Is a group of plants closely allied to the *Cruciferæ*, but distinguished by the stamens being usually numerous and the ovary raised on a stalk. *Capparidaceæ* are herbaceous or shrubby, and are easily propagated by seed.

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[*] *Iberis*, from *Iberia*, the former name of Spain.

[†] *Umbellata*, having an umbel.

[‡] *Odorata*, sweet-scented.

[§] *Mathiola*, after Peter Andrew Mathiol, 1500—1577, an Italian Botanist.

[||] *Malcolmia*, after William Malcolm, a London Nurseryman, who published a catalogue of greenhouse plants.

[¶] *Capparidaceæ*, from the genus *capparis*, old Greek name used by Dioscorides for the Persian capers.

In Southern Europe the flower buds of *Capparis spinosa* are pickled in vinegar, forming the favourite condiment, capers.

CLEOME * SPECIOSISSIMA.†

A very beautiful annual, growing three feet high and flowering from September to November. The flowers are rose-coloured.

May be grown from seed. Sow where the plant is wanted to bloom any time between May and August. An ordinary garden soil and occasional watering in dry weather are required.

CAPPARIS MOONII,‡

A shrub with large white or rosy flowers, resembling a tassel, from the very abundant stamens. Is plentiful on the ghauts, and should find a place in the garden. It may be raised from seed sown in a deep friable soil, watered freely during the rainy, and kept dry during the dry season.

CAPPARIS SPINOSA.§

The flowers of this straggling, thorny shrub are very showy, and are produced freely during the cold season. In districts where the rainfall is between forty and fifty inches and the soil not retentive of water, it may be used to form a fence perfectly impenetrable to cattle, ornamental if the flowers are permitted to open, or useful if the flower-buds are gathered and pickled.

RESEDACEÆ.‖

This small family has a solitary member in our gardens; the well known *Mignonette*, *Reseda odorata*. This sweet-smelling herb thrives well if sown between August and November in a deep friable soil containing ***abundant old mortar or limestone.*** The seed should be sown where the plant is wanted to bloom, and its effect is good and success more easily attained when a mass is grown. Slight shade during the hot part of the day is desirable when the plants are young, and water should be given daily at that time, but as the roots get downwards water should be given in large quantities at intervals of three or four days. Occasional watering with liquid manure is desirable, and frequent stirring of the surface is necessary wherever liquid manure is used. Save seed by spreading a sheet under the plant and shaking it. If seed is collected in this way, it will be found more reliable than imported seed. The price of ordinary mignonette seed in London is about 6*d.* per oz., but superior varieties are sold at 1*s.* per packet. The quantity a packet contains is usually sufficient for a bed of 100 square feet, or ½ oz. of the finer varieties of mignonette. Garaway's White is the finest of the white shades, and Golden Queen is of dense pyramidal growth and golden colour, and Mammoth, a new variety of large size, is described as producing wonderful spikes of bloom in New York gardens.

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* ***Cleome***, name adopted by Linnæus from Theodosius.

† ***Speciosissima***, most beautiful.

‡ ***Moonii***, after Moon, a plant collector.

§ ***Spinosa***, thorny.

‖ ***Reseda***, the old Latin name used by Pliny, from ***resedo***, to calm or please.

VIOLACEÆ, *The Violet Family,*

As represented in our gardens, is a very small group of herbaceous plants, including the violet and heart's-ease.

A remarkable habit in fertilisation occurs in this family. The showy flowers which some of the species send up well above the foliage produce very little seed, and abundant seed is produced by small flowers on short stalks near the root. These flowers are fertilised by their own pollen without opening fully *(cleistogamic)*. This is evidently one of the very numerous arrangements for self-preservation employed by plants and is to be seen in a more striking degree in our *Commelina communis*, Marathi *kanna*, which produces seed on *underground flowers only*.

VIOLA[*] TRICOLOR,[†] *The Pansy or Heart's-ease,*

May be sown between September and November, and the seedlings transplanted to a bed of fine friable soil kept open by numerous pieces of limestone or old mortar in a situation protected from the midday sun, where they will thrive between January and March, but generally give way during the hot and rainy season.

VIOLA ODORATA,[‡] *The Sweet Violet,*

Grows as a perennial in gardens in the dry parts of India if protected from bright sunshine and watered regularly. The most satisfactory results are attained by arranging a bank sloping northwards on the shady side of a tree and giving fresh soil with abundant limestone in it about once in six months. The flowers appear at various times, but are most abundant at the end of the rainy season.

BIXACEÆ.

The small group has two representatives in our gardens, which are well worthy of their place, and give very little trouble to cultivate.

BIXA[§] ORELLANA, *The Arnatto Tree, Latkan, Kesher-ke-jhar of the Mallees.*

This small tree must not be confounded with the source of true *Kesher*, saffron, which is the dried stigmas of a lily cultivated in the South of Europe, *Crocus sativus*.

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[*] *Viola*, a violet.

[†] *Tricolor*, three-coloured.

[‡] *Odorata*, sweet-scented.

[§] *Bixa*.—Its South American name.

The name applied to it by the mallees on account of the resemblance of the colouring matter it yields to saffron is much to be deprecated, as it often leads to unseemly blunders. This is a small tree having broadly heart-shaped pointed leaves, and very numerous white or rose-coloured flowers with very numerous stamens, followed by green or red capsules furnished with very many soft spines and enclosing seeds which have a covering of a deep orange colouring matter, useful in dying silk and in tinting butter or cheese.

The plant looks well in the shrubbery at some distance from the path. It grows in any fair garden soil and is propagated from seeds.

COCHLOSPERMUM GOSSIPIUM, *Kumbi, Gameri, Gunglay.*

A small deciduous tree with 3 to 5-lobed leaves, which become yellow and withered soon after the rainy season, falling towards the end of the year. During the hot season bright yellow flowers, 4 to 5 inches in diameter, followed by a 5-lobed capsular fruit, as large as a goose egg, which separates into two layers, showing a whitish membranous endocarp and numerous seeds the size of a small pea enclosed in long cottony fibres. This tree thrives in the Botanical Garden at Calcutta, where the soil is deep alluvium and near some of the hill temples on the Western Ghauts where the rainfall is heavy.

PITTOSPOREÆ.[†]

A group of small trees or shrubs with alternate, entire, very rarely toothed, exstipulate leaves, often arranged in whorls towards the ends of the branches.

The garden species of *Pittosporum* have greenish white sweet-smelling flowers followed by a capsular fruit, which

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[*] *Cochlospermum*, shell seed.

[†] *Pittosporum*, pitch seeds, from their pitch-like appearance.

splits open and displays the black pitch-like seeds, from which the name of the family is derived, contrasted with the bright red of the inside of the capsule.

POLYGALEÆ, *The Milk Wort Family.*

This group consists of herbs or undershrubs having milky sap, alternate leaves without stipules, and flowers coloured white, yellow, purple, or red, which resemble in form flowers of many *Leguminosæ*, but the coloured portion is often partly due to the calyx, of which two leaves in some species assume the appearance of the aloe in the Pea flower tribe.

The absence of stipules and the presence of milky sap and two-celled fruit are the easiest characters by which they may be distinguished from the Pea flower family. We have several indigenous species which, occurring in dry pastures, with yellow flowers appearing during the rainy season, but more ornamental species are found on the hills of India and other temperate climates such as the Cape of Good Hope and Britain.

POLYGALA* PERSICARIÆFOLIA†

Is a pretty little upright-growing herb with bright rosy purple flowers and linear elliptic lanceolate leaves and is found on the hill ranges.

POLYGALA MYRTIFOLIA‡ GRANDIFOLIA§ AND POLYGALA VIRGATA SPECIOSA

From the Cape are favourite greenhouse plants in Britain and doubtless would thrive at our hill stations.

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* *Polygala*, from *polis*, much, and *gala*, milk, in allusion to its reputed quality of increasing the secretion of milk.

† *Persicaræfolia*, having leaves as in the genus *Persicarium.*

‡ *Myrtifolia*, myrtle-leaved.

§ *Grandifolia*, large-leaved.

CARYOPHYLLACEÆ,* *The Pink Family,*

Are herbaceous plants with stems swollen at the nodes and sessile grass-like leaves. All are natives of temperate climates and many grow in tufts on the shores of Britain.

DIANTHUS† CHINENSIS,‡ *China Pink.*

Seed of this beautiful herb may be sown any time between May and November in the dry parts of the country; but where the rainfall is heavy, sowing should be deferred till September; a deep sandy well-manured and drained soil is necessary. The seed may be sown on a bed of carefully-worked soil, and the seedlings planted out six inches apart.

SILENE§ PENDULA,|| *Catchfly,*

Is so called from the presence of viscid glands on the cell to which flies adhere. If sown in October on good soil and regularly watered, this annual is showy by January with numerous pinkish flowers.

DIANTHUS CARYOPHYLLUS, *The Carnation,*

Thrives freely at some of the hill stations and occasionally blooms at Poona. A friable soil mixed with equal parts of decayed garden sweepings and sharp sand, potted very firmly and kept in a situation open to the morning sun with abundant light, but protected from direct sunlight after 10 o'clock, is suitable. Propagate by cuttings of the short branches in a close frame during October.

DIANTHUS BARBATUS,¶ *Sweet William.*

In districts with light rainfall Sweet William seed, if sown in pots in June, carefully grown on, and the plants separated

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[*] *Caryophyllaceæ*, from the perfume resembling cloves, from *karnon*, a nut, and *phyllon*, a leaf.

[†] *Dianthus*, *dios*, divine; *anthos*, flower.

[‡] *Chinensis*, of China.

[§] *Silene*, said to be derived from *sialon*, saliva.

[||] *Pendula*, hanging.

[¶] *Barbatus*, bearded.

as they increase in size ample space being given to each, some fine blooms of this homely plant may be obtained in spring.

POLYCARPÆA[*] CORYMBOSA.[†]

An erect herbaceous annual attaining nine inches in height with small narrow leaves and minute bright silvery terminal flowers which retain their beauty when dry. It is found abundant in dry pastures in the Deccan during the rainy season and is worthy of careful attention for use in bouquets and table decoration.

LYCHNIS[‡] FLOSCUCULI,[§] *Ragged Robin.*

An herbaceous plant with opposite sessile leaves 2½ by 1 inch and heads of pale pink flowers of a ragged appearance. The treatment is the same as the Carnation.

PORTULACEÆ, *The Purslane Family.*

A small group of herbaceous or shrubby plants with succulent leaves; valued as pot herbs and ornamental plants.

PORTULACA[‖] OLERACEA,[¶] *Ghol, Loonya or Noonya Shak.*

An annual succulent herb, often appearing as a weed in gardens. Prepare a bed of friable rich soil, water thoroughly, sow the very fine seed thinly, and sprinkle a little dry soil over it. Shade slightly to prevent rapid drying until the seed has germinated. Any time between June and March is suitable.

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[*] *Polycarpœa,* many-fruited.

[†] *Corymbosa,* having flowers in corymbs.

[‡] *Lychnis,* the old Greek name given by Theophrastus, from *lychmos,* a lamp.

[§] *Floscuculi,* the cuckoo flower.

[‖] *Portulaca,* the old Latin named used by Pliny, but by him spelt *porcilaca.*

[¶] *Oleraceæ,* culinary.

During the rainy season the bed should be raised to allow perfect drainage and fresh sowings should be made fortnightly to keep it in good condition.

The indigenous variety spreads on the surface and is difficult to keep clean: the varieties cultivated in Europe stand upright and produce larger leaves than the wild sort. Green and golden varieties are in cultivation.

PORTULACA GRANDIFLORA*

Is a very beautiful low-growing annual. Sow where it is wanted to grow between September and November, having the soil thoroughly manured and watered previously.

TALINUM† CUNEIFOLIUM.‡

A very pretty herbaceous plant with an upright stem bearing alternate succulent wedge-shaped leaves and terminated by a graceful panicle of small rose-coloured flowers followed by a small globular three-valved capsule containing several seeds.

When seen growing on rocky banks at Singhur and other hill stations in the Deccan this plant is greatly admired. A similar position should be given to it in gardens. It may be propagated by seed or cuttings.

PORTULACARIA§ AFRA,‖ *The Purslane Tree.*

A small bush with the appearance of a miniature tree with a thick stem and drooping branches bearing small wedge-shaped or circular succulent opposite leaves. The flowers are pink, but are rarely seen in this country. This plant is a native of the Cape of Good Hope, where it is used as a pot herb. When planted in an ornate tub with rich stony soil and used for the decoration of gateways, as it may be seen in the Public Park, Baroda, it is very ornamental.

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* *Grandiflora*, large-flowered.

† *Talinum*, said to be the name given by the negroes of Senegal, by whom it is eaten as a salad.

‡ *Cuneifolium*, having wedge-shaped leaves.

§ *Portulacaria*, from its resemblance to *portulaca*.

‖ *Afra*, African.

TAMARISCINEÆ,[*] *The Tamarix Family.*

The cultivated members of this small family are very graceful shrubs or small trees with slender branches, minute leaves, and abundant small white or rose-coloured flowers. Their natural habitat is sandbanks in the middle of rivers, but they thrive in ordinary sandy soil freely watered during the rainy season and are very ornamental. The branches and galls produced on them, called *maij* or *burri maij*, are valued as a mordant by tanners and dyers (Dr. Lisboa). Among the species worthy of cultivation are TAMARIX GALLICA,[†] *Jhavuka, Jhou, Jhouca, Jhaoo, Lai, Casurncc;* TAMARIX DIOICA,[‡] *Lal jhou, Pichula sarru;* and TAMARIX ARTICULATA.[§]

ELATINEÆ

Are minute semi-aquatic or terrestrial herbs or undershrubs. The most interesting is *Bergia ammannioides,* an annual which springs up on the margins of ponds and bears minute red flowers in dense subverticulate fascicles.

HYPERICINEÆ,[‖] *St. John's Wort Family,*

Are herbs or shrubs with opposite leaves, often punctate, with pellucid glands or dark glandular dots and showy flowers.

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[*] *Tamariscineæ,* from *tamarix,* the old Latin name used by Pliny.

[†] *Gallica,* French.

[‡] *Dioica,* having male and female flowers on separate plants.

[§] *Articulata,* jointed.

[‖] *Hypericineæ,* from the genus *hypericum,* an old Greek name used by Dioscorides.

They are temperate climate plants and occur in the Hymalaya and mountains of warm regions.

HYPERICUM MYSORENSE,*

A smooth shrub with four-angled branches and opposite leaves 1 to 2 inches in length, tapering to an amplexicante base, with slender ascending veins and pellucid striæ and bright yellow flowers 2 to 2¾ inches in diameter, and

HYPERICUM PERFORATUM,†

A perennial herb attaining 18 inches and having ¾ inch obtuse leaves with radiating veins and black dots on the pale undersurface. The flowers are 1 inch in diameter and bright yellow in a handsome terminal corymb and the petals have dark spots near the margin. This beautiful shrub is found wild in Britain as well as on our mountains, and should be more common in hill gardens than it is. Propagated by division.

GUTTIFERÆ,‡ *The Mangosteen and Gamboge Family.*

A group of trees or shrubs abounding in yellow or greenish juice and including many beautiful trees valued for delicious fruit (Mangosteen), sweet flowers *(woondee)*, and fine timber (Poon spars).

GARCINIA MANGOSTANA, *Mangosteen.*

A small conical tree 20 to 30 feet with entire leathery leaves 6 to 10 by 2½ to 4¼ inches, having regular close nerves inarching with an intra-marginal one. The flowers are either males interminal fascicles with both sexes, solitary or in pairs, followed by fruit as large as an orange, which is smooth, dark purple, with a firm covering having a spongy layer and containing large flattened seed having a white fleshy and juicy growth from the seed stalk (aril), which is the part eaten.

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* *Mysorense*, from Mysore.

† *Perforatum*, perforated.

‡ *Guttiferæ*, from the genus *guttifera*, from *gutta*, caoutchouc, and *fera*, bearing.

This fruit tree is a native of, and cultivated in, the Malayan Peninsula and Southern Tenasserim, and is also cultivated in the hottest and most equable moist districts of Southern India and Ceylon. It is easy to obtain seedling plants from its native habitat, and many attempts to cultivate it throughout India have been made, so far without success. It proves of very slow growth, and it is questionable whether, if those seedling plants bore fruit, it would be equal to that which has given this plant its reputation of bearing the most delicious fruit known.

The fruit borne by seedling fruit trees is remarkably variable, and the finer varieties, which are propagated by layering and grafting, would be much more likely to repay the cost of cultivation than seedlings. I grafted the Mangosteen to *Garcinia Indica (kokum)* at the request of Mr. Robertson, Revenue Commissioner, and the graft was sent to Rutnagherry for the moist climate necessary for its development. I do not expect it will be successful. The mangosteen has large leaves and thick branches; the kokum bears small leaves and slender branches. If the stock and scion were reversed, more success might be expected, and approved varieties grafted on seedlings of the same tree would probably be useful. The idea that suggested the above experiment was that the hardy stock would communicate its hardihood to the scion. The respective influence of stock and scion is still a very obscure subject, and no such decided effect as it required in this instance has yet been recorded. It is probable that the introduction of railways will bring this fruit to our doors ere long, but in the meanwhile rich men in Central India might take up its culture. It would be necessary to provide a

MANGOSTEEN HOUSE, which should be a glass house 100 by 50 feet and 20 feet high in the centre fitted with ventilating windows, waterpipes, and a mat shade raised two feet above the glass. In this house the mangosteen trees would be planted out in beds of rich well-drained soil. The hot winds would be excluded and abundant moisture maintained. In such a house bananas and pine apples of a quality not attainable in open-air culture and pitcher plants, tropical orchids, and other choice plants could be grown to perfection.

MESUA* FERREA,† *Nag champa, Thorla champa, Nag kesura, Nagsara.*

A very striking small tree, having a straight stem, opposite, leathery, lance-shaped, drooping leaves and large pure white flowers. A deep stony soil, with thorough drainage and abundant water during the monsoon, is suitable. Propagate by seeds, which must be fresh when sown.

GARCINIA INDICA *(Garcinia purpuria, Rox.), Kokum, Brindoa.*

A beautiful small tree of upright conical habit, the branches ultimately drooping and bearing opposite, obovate, entire leaves 3 by 1½ inches of bright coppery colour while young and dark green, smooth, and leathery when mature. The flowers are inconspicuous and are followed by globular purple fruit the size of a small orange, containing several large seeds, from which a concrete oil is obtained by crushing and boiling the seed in water. This oil preserves its solidity to 98°. Fahr.

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* *Mesua*, after Mesue, Arabian botanists of the eighth and ninth centuries.

† *Ferra*, iron-wooded.

and is found an excellent remedy for chapped hands and is believed to be mixed with bears' grease in the preparation of pomatum. A statement quoted from the *Bombay Courier* of 12th June 1830 by Graham in his Catalogue of Bombay Plants and copied into many other books to the effect that it is used for adulterating *ghee* at Goa is at length denied by a writer in the *Times of India* who evidently knows the subject, and shows there is very little *ghee* made at Goa, as the people of that district prefer pork as a source of oil for food.

The tree is of easy culture in districts within the influence of the sea breeze, but rarely bears fruit inland. It is propagated by seed.

CALOPHYLLUM* INOPHYLLUM,† *Woondee, Sultana champa.*

A small tree of rather crooked growth growing naturally near to the sea on the Malabar coast. It has opposite, oval, entire bright, shining leaves 4 to 8 by 3 to 4 inches on stalks ½ to 1¼ inches and pure white fragrant flowers ¾ inch in diameter, produced in great abundance nearly throughout the year and followed by globular, smooth, yellow, one-seeded fruit 1 inch in diameter. This tree thrives well in moist districts, and in the public gardens at Bombay and Calcutta fine specimens may be seen; and in positions sheltered from hot winds and freely watered it also grows inland. In dry districts it needs a deep stony soil with slight shade and regular watering while young.

OCHROCARPUS‡ LONGIFOLIUS,§ *Suringee, Poona.*

A very striking small tree, a native of Kanara, where the climate is very moist. It has a straight stem with opposite branches disposed at nearly right angles and bearing opposite entire leaves 8 to 10 inches in length by 2 to 2½ inches in breadth; bright copper-coloured while young, and when mature dark green and leathery. The flowers are white, have four deciduous petals, and are followed by an obliquely ovoid fruit, tipped by the hard-pointed style. It is propagated by seed and in dry districts needs shelter from hot winds.

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* *Calophyllum*, from *kalos*, beautiful, *phyllon*, a leaf.

† *Inophyllum*, fibrous-leafed.

‡ *Ochrocarpus*, from *ochros*, yellow; *carpos*, fruit.

§ *Longifolius*, long-leafed.

TERNSTRŒMIACEÆ,* *The Tea Tree Family,*

Consists of shrubs or trees with alternate leaves and handsome flowers, rarely small. The tea tree and the camellia flower of temperate climate gardens are sufficient examples.

CAMELLIA† THEIFERA,‡ *The Tea Tree.*

The tea tree as it should be grown in every educational garden in India is the only part of the subject that can be taken up here. As a commercial matter the cultivation of tea already fills the "Tea Cyclopædia," a large volume published at Calcutta, and several other books. The climate in which tea thrives may be described, for India, to be warm and moist. Low clouds which bathe the plants in dew at short intervals are desirable and hot dry winds objectionable. A rainfall of about 100 inches, well distributed throughout the year and an average temperature of 70° F. would make an ideal tea climate. To grow a few tea trees for ornament or instruction a sufficiently near approach to that climate can be made in a grass or mat conservatory in any part of India. The tea tree is a pretty shrub with alternate, very short-stalked elliptical, oblong, obtuse or pointed, serrate, dark-green leaves and white flowers 1 inch in diameter produced in great abundance if the plant is not pruned freely to prevent flower and induce free growth of leaves. Any good rich loamy soil is suitable. It is easily raised from seed.

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* *Termstrœmiaceæ*, after Christopher Termstrœm, a Swedish naturalist.

† *Camellia*, after George Joseph Camellus, a Moravian Jesuit.

‡ *Theifera*, tea-bearing.

CAMELLIA JAPONICA, *The Camellia.*

Many attempts to grow this beautiful shrub in the plains of India have been made. It is easy to purchase Camellia trees in Europe with flower buds slightly developed, which can be induced to open their flowers in the conservatory and to drag through existence without flowering during two or three years afterwards; but anything more satisfactory has not been attained so far; on the hills it is different. In the Botanical Garden at Ootacamund fine Camellia trees in full flower may be seen during the spring months and a study of the climate of that station as shown in the meteorological tables will show what probability may exist of its flourishing at another station. Propagation may be effected by layers, the finer varieties are usually inarched to stocks of a common variety that is found to strike root freely from cuttings.

DIPTEROCARPEÆ, *The Two-winged Fruit.*

A very important group of resinous trees, yielding *gurjun* oil, Bornean camphor, *sal* timber, and piney dammar, or gum conimi. Seeds in this family retain germinating power a very short time—indeed, *sal* seed often germinates before it falls from the parent tree.

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* *Japonica*, of Japan.

† *Dipterocarpeæ*, from the fruit having two wings.

DIPTEROCARPUS TURBINATUS,* *The Gurjun Oil Tree, Kamyin,*

Is in Lower Burmah a large tree, with alternate simple entire leaves, 5 to 12 by 2½ to 7 inches with 14 to 18 pairs of lateral nerves, resembling the leaves of *Dillenia*, and pinkish white flowers 3 inches in diameter, which appear at the beginning of the hot season, followed by a nut-like fruit, and have two erect wings 5 by 1 inch.

The *gurjun oil* is obtained by tapping the stem. This tree should be grown in every large garden in the moist districts. It is difficult to get seed in germinating condition, but it might remain alive if packed in wet earth.

SHOREA† ROBUSTA,‡ *Sal,*

Is an immense timber tree of the Eastern districts of Central India, which is sometimes raised in gardens for road-side planting. For this purpose baskets should be prepared during the hot season filled with a mixture of one-half leaf mould and one-half surface soil and kept in a shady place. The fresh seeds, gathered in June, should at once be planted in the baskets and watered. The seed will germinate soon, when it must be gradually thinned out until one good plant is in each basket. The trees will be ready to plant out by the following rainy season.

MALVACEÆ, *The Mallow or Bendi Family.*

This is a large group of plants of great importance, both from an economic or an ornamental point of view. Of economic importance it includes cotton, *ambaree*, the *bendi*, and many other valuable plants, while as garden ornaments

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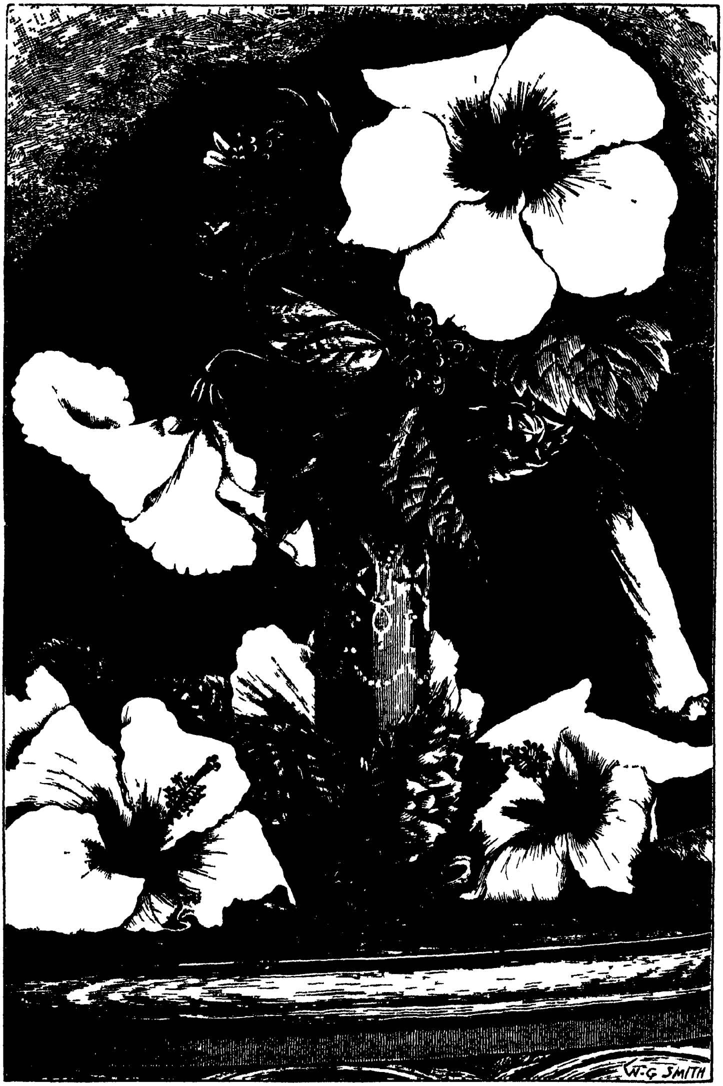
[*] *Turbinatus*, like a wheel.

[†] *Shorea*, after Sir John Shore, Governor-General of India, 1793-1797.

[‡] *Robusta*, quick-growing.



HIBISCUS ROSA-SINENSIS, WITH FRUIT.

what are more beautiful than the many varieties of *Hibiscus (Jassoondie)?*

In this family propagation is effected chiefly by seeds, but the shrubby plants are generally propagated by cuttings, which strike root freely if planted in sandy soil kept shaded and moist. The cold season is the most favourable time, but with the aid of a propagating frame any season is suitable.

HIBISCUS* ROSA SINENSIS,† *Jassoondie, Juwa,*

Is one of the brightest ornaments of Indian gardens, the large single-flowered forms being particularly bright. This plant strikes freely from cuttings planted any time between June and December, and thrives in any fair garden soil enriched with garden sweepings. As it flowers much more freely when of some age than when young, old plants should be carefully looked after and any dead and weakly or crowded branches removed. This *Hibiscus* is very rarely found in seed, but in December 1879 a large number of specimens in the neighbourhood of Poona, in a great variety of situations, bore fruit which is figured in the engraving of *Hibiscus rosa sinensis.*

Typical varieties of this plant open their flowers at different times of the day, but mostly during early morning and close again in the evening by twisting up the petals, which ultimately fall off without reopening.

The object of the flower in twisting the withered petals together is not very clear, probably it is to protect the fertilised ovales, but the removal of the ovary and stamens does not affect the disposition of the coralla to twist up. Double varieties scarcely attempt to close, and remain decorative for two or three days.

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* *Hibiscus,* from *hibiscos,* the Greek name of the mallow.

† *Rosa sinensis,* the rose of China.

Varieties of this shrub are very numerous, varying from 6 inches in width of flower to 2 inches and from deep crimson to pale rose or yellow. Some of the finest varieties as garden flowers have the stamens reverting to petals, forming what is called a double flower, which is useful because it does not close as quickly as the typical single flowers.

The following are particularly worthy of cultivation:—

HIBISCUS ROSA SINENSIS BRILLANTISSIMUM.

With bright crimson flowers 5½ inches across.

HIBISCUS ROSA SINENSIS, *Gama* of Firminger,

Has pale straw-coloured double flowers and is a very desirable variety.

HIBISCUS ROSA SINENSIS COOPERI,

Has leaves richly variegated with many shades of rose, and when grown fully exposed to light is of a dense habit of growth forming a compact richly-coloured mass of foliage.

HIBISCUS LILIIFLORUS*

Resembles the common *Jassoondie*, but has flowers of greater substance and leaves often entire or much less toothed than other varieties. It is also more difficult to propagate; that is, it needs a little care, such as a propagating frame, while the other varieties need only the shelter of a shrubbery to strike root.

HIBISCUS ESCULENTUS,† *Bhendi, Okra, Ramtooray, Dharoos, Bundayka.*

Sow on a rich well-watered soil every fifteen days from 1st May to 1st December. Good varieties of dwarf habit, free from the disagreeable spine-like hairs, are cultivated near

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* *Liliiflorus*, lily-flowered.

† *Esculentus*, eatable.

Bombay. These may be sown in lines two feet apart and thinned out to six inches apart in the lines. Save seed from the best plants, and get fresh seed from Bombay at frequent intervals.

HIBISCUS CANNABINUS,* *Ambaree, Mestapat, Puloo, Gungkura.*

A common pot-herb in its young state; for this purpose it should be sown on a rich soil and regularly watered, so as to produce succulent growth. Fresh sowings may be made once in ten days between June and March. When grown during the rainy season as a field crop, the inner bark yields an excellent fibre for ropes.

HIBISCUS SYRIACUS†

Is an upright-growing species, having lilac flowers with a purple spot 'eye' in the centre. A variety of this plant with double white flowers is a very striking plant when in bloom; it thrives in a rich alluvial soil, well drained, regularly watered. It should be transplanted yearly, and the roots trimmed, as they grow to a considerable length. Cuttings planted in October make good plants by the following June. There are numerous varieties of this shrub cultivated in Europe.

HIBISCUS SCIZOPETALUS.‡

A very attractive species introduced from Zanzibar about 1883. The flowers are pendulous with recurved laciniate petals of a deep orange red and a long slender style surrounded by the united filaments of the stamens projecting about 2 inches beyond the corolla. It is propagated by cuttings very easily.

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* *Cannabinus*, hemp-yielding.

† *Syriacus*, from Syria.

‡ *Scizopetalus*, having cut petals.

HIBISCUS SCIZOPETALUS GRANDIFLORA

Is one of a number of fine hybrids raised by Mr. Chatterjee, the well-known nurseryman of Calcutta.

HIBISCUS ROSA SINENSIS SPLENDENS

As seen in the Botanical Garden at Calcutta is a very fine variety of the well-known *Jassoondic.* It has a vigorous symmetrical habit and large flowers of a deep crimson shade.

HIBISCUS TILIACEUS.*

A small tree bearing alternate stipulate heart-shaped leaves and large sulphur-coloured flowers which appear throughout the year in gardens, but chiefly during October and November. It is indigenous in moist districts and needs shelter when planted inland.

HIBISCUS ELATUS,† *Cuba Bast Tree.*

In a deep loamy soil at Poona this tree thrives and bears its large fleshy-petaled, sulphur-coloured flowers freely.

HIBISCUS PANDURÆFORMIS ‡

One of the numerous plants called *rán bendi* by the people of its habitat, the Deccan, may be seen at the side of the railway between Lanowlee and Poona during the cold season. It is an erect-growing plant attaining six feet high, but dying down to the ground during the hot season. The flowers are golden coloured with a dark centre and fugaceous, the leaves are more attractive, and they are densely clothed with soft hairs varying from golden to dark-brown in wavy shades of rich colouring. The full beauty of the leaves may be seen by placing a few in a dinner table decoration, and even as dried herbarium specimens they retain their beauty.

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* *Tiliaceus*, like the lime tree.

† *Elatus*, tall.

‡ *Panduræformis*, fiddle-shaped.

Its cultivation is easy. Seed sown on an ordinary garden soil in June and watered occasionally during the first two months is sufficient. Its name probably is derived from the circle of slightly fiddle-shaped bracts under the flower.

HIBISCUS FURCATUS,

A native of the Western Ghauts near Vingorla, is a very showy plant. It is of climbing habit, and all over rough with the recurved prickles by which it ascends among the branches of other shrubs. The flowers are solitary axillary pedunculate, 4 inches in width, of a golden colour, abruptly changed in the centre to a deep crimson and the stamens are dark brown.

On the calyx are 10 linear incurved bracts, each having an oblong foliaceous appendage at its back near the middle, the leaves are palmately 3 to 5-lobed.

The arrangement of colour in this flower is peculiar and its purpose would be an interesting study. The arrangement of colour in flowers generally is intended to guide particular insects into the most favourable positions to assist in conveying the pollen from one flower to another. The manner in which this is effected in the ordinary flowers of an Indian garden would suffice for a large volume of most interesting observations. This plant is easily propagated by seed and produces its gay-coloured flowers during the cold season.

ADANSONIA* DIGITATA,† *The Baobab, Gouruk Chintz.*

A very remarkable-looking plant with a trunk of great thickness in proportion to its height, mentioned in Livingstone's travels as the Baobab. It thrives without special care in the moist districts, if planted so that the soil may not remain flooded. In dry districts a deep open stony soil is desirable. It produces a large fruit, which contains an agreeable acid pulp. Propagated by seeds. The fibre of the bark is reported to be of great strength—a condition very common in this family.

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* *Adansonia*, after Michael Adanson, a French botanist.

† *Digitata*, having finger-like leaves.

HIBISCUS SABDARIFFA,* *Rozelle, Patwa, Lal-ambari,*

Should be sown in a rich seed-bed in July or August, and when six inches high transplanted into lines two feet apart with the plants 18 inches apart in the line. The "fruit" in this case is the calyx, which continues to enlarge after the other whorls of the flowers have fallen away (accrescent); it is pleasantly acid and makes a favourite jelly.

Dymock in the "Vegetable Materia Medica of Western India" writes of this plant:—"In bilious conditions a diet drink is made by boiling it with water and adding a little salt, pepper, assafœtida, and molasses. The seeds are excellent food for cattle and the stems yield tow. The cultivation is attended with little expense, the seed being sown at the commencement of the rainy season and the crop ripening at its close.

On analysis by Dr. Lyon the calices gave per 100 parts of dry substance 27·44 of free acid, chiefly malic and tartaric. It is used as a source of acid in the dietry of some jails and evidently deserves more attention than has been given to it hitherto.

MALACHRA† CAPITATA‡

Is useful in the garden for making a screen in places where the soil is wet, and the fibre of the bark is useful for tying purposes. It has been recommended as a field crop in the Concan. Propagated by seeds.

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* *Sabdariffa,* uncertain, probably the vernacular name in Persian.

† *Malachra,* an old name used by Pliny to denote a Persian tree.

‡ *Capitata,* having flowers in heads.

BOMBAX* MALABARICUM,† *Kanta Scirie, Salmuli, Simul Boorgha.*

A beautiful tree, armed with thorns on the bark, and having leaves divided into finger-like portions rising from one point (digitate), and large red flowers appearing while the tree is without leaves in the hot season, followed by large pods containing white hairs resembling cotton, but wanting in the valuable property of spinning into a strong thread. A deep stony soil with abundant water at long intervals is suitable. Propagation is by seed.

ERIODENDRON‡ ANFRACTUOSUM, *Shamcula, Safed Simul.*

A large tree much resembling the above, but with white flowers and fewer prickles. Cultivation is similar.

MALVAVISCUS§ ARBOREUS||

Has small red flowers produced in great numbers; it is a suitable plant for a screen shrubbery, as it is hardy and needs little attention. *Abutilon Indicum* is also useful for the same purpose.

GOSSYPIUM.¶

The various species of this genus which yield the different kinds of cotton are not much grown in gardens; but as they are highly interesting and very beautiful plants they are well worthy of a place. Moreover, if cultivated in gardens, these

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[*] *Bombax*, from *bombax*, one of the Greek names for cotton.

[†] *Malabaricum*, from Malabar.

[‡] *Eriodendron*, *erio*, wool, and *dendron*, a tree.

[§] *Malvaviscus*, from *malva*, the mallow, and *viscus*, glue.

[||] *Arboreus*, tree-like.

[¶] *Gossypium*, the Latin name used by Pliny for the cotton plant.

plants would be more likely to vary or, as it is technically called, sport, and some of the varieties produced would probably yield cotton of better quality than is at present obtained from the fields. In any case the cotton tree is quite as beautiful and a great deal more useful than many of the plants called Crotons.

THESPESIA[*] POPULNEA,[†] *Bhendi tree, Gangaraya, Poris, Poresh,*

Is a very beautiful tree when grown from seed. The specimens commonly seen are grown from large cuttings and have little of the tree character. The flowers are a clear bright yellow with a maroon eye, and are succeeded by turban-shaped black seed-pods, which hang on the tree a long time. The timber is used for spokes of carriage wheels In districts with a moist climate this tree is used for roadside purposes.

THESPESIA LAMPAS,[‡] *Rán bhendi,*

A native of the Western Ghauts and other hilly districts with heavy rainfall, is one of the most beautiful of this very showy family, but is seldom to be seen in gardens. The flowers are very large, of a bright pale yellow, with a crimson spot in the centre, and droop gracefully. The plant grows about four feet high, and should be cut down to six inches in February. It is propagated by seeds or cuttings. Seeds may be collected in the jungles near Khandalla in January.

ABUTILON[§] STRIATUM.[||]

Many varieties of this beautiful shrub with flowers of various colours may be got from a packet of seed. It enjoys a rich loam and frequent repotting, and should be sponged with soapsuds, having a small quantity of kerosine oil mixed with it, to keep down insect pests.

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[*] *Thespesia*, from *thespesios*, divine.

[†] *Populnea*, like the poplar tree.

[‡] *Lampas*, a lamp.

[§] *Abutilon*, the Greek name for the mulberry—applied to this genus from the resemblance of the leaves.

[||] *Striatum*, striped.

STERCULIACEÆ

Includes the cocoa or chocolate tree, *Theobroma cocoa*, and many other striking ornaments of the garden. Generally trees with odorous, or, as the name implies, often malodorous, flowers. In *Sterculia colorata* and other species the fruit, opens before it is ripe, displaying its structure in a way that is of great use to botanical students.

PTEROSPERMUM* ACERIFOLIUM, *Kurnikari*, *Kunuk champa*,

Is one of the most beautiful trees. The leaves are 10 to 14 inches in length by 6 to 10 inches in width, varying much in form between oblong and heart-shaped, are dark green above white beneath; the sepals are thick, with parallel sides (linear) and of a golden brown colour; the petals are pure white and four inches long, linear and turned backwards; the flowers, which appear in great numbers between November and March, have a very sweet perfume. This tree grows well in a loose stony soil, manured with garden sweepings, and watered thoroughly at intervals of a month during dry weather.

It is a favourite road-side tree at Bombay and Calcutta, and at Poona it thrives well in gardens; from this the districts where it may be planted with success will be ascertained by a study of the climate tables. Propagation is effected by seeds and layers.

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* *Pterospermum*, winged seed.

PTEROSPERUM SUBERIFOLIUM,* *Muskunda, Moochukunda, Taddo-marum*,

Is a small tree with leaves 2 to 6 inches long by 1 to 2 inches broad and has sweet-smelling white flowers; it thrives in ordinary garden soil watered occasionally and ripens seed abundantly, which serves for its propagation.

ERIOLŒNA† CANDOLII.‡

A tree with heart-shaped leaves 5 by 4 inches long with 5 to 7 ribs, branching from the end of the leave stalks, and pretty yellow flowers 1½ inches in diameter, appearing in January.

It is indigenous in districts with heavy monsoon rains, for instance, Ram Ghaut in the Concan, but thrives in Deccan gardens. Propagated by seeds.

STERCULIA§ FŒTIDA,‖ *Deodar* of *Western India*, *Kuo-mhad*, *Virhoi*, Goa, Dr. Lisboa.

A stately tree with a smooth stem rising to a considerable height without branches, which are produced in regular whorls nearly at right angles with the stem and bear digitate leaves on long footstalks. The flowers, which are of a dull white colour and have a disagreeable smell, fortunately do not last long when they appear in March. Any deep rich soil is suitable. In dry districts irrigation is necessary until the tree sends its roots deeply into the soil. Propagation is effected by seeds.

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* *Suberifolium*, cork-tree-leaved.

† *Eriolœna*, *erion*, wool; *chlania*, a clock.

‡ *Candolii*, of Decandol.

§ *Sterculia.—Sterculius*, a Roman god, from *stercus*, dung.

‖ *Fœtida*, fœtid.

STERCULIA COLORATA,[*] *Khowsey, Bhai-koi, Bodala, Samarri, Walena.*

A large tree with alternate leaves 6 to 9 inches long by 5 to 12 inches broad, crowded at the end of the branches, where it bears erect panicles of deep orange-red flowers wanting the corolla.

This tree is a native of the Western Ghauts, and apart from its showy flowers should be cultivated wherever botanical students meet. Its carpels are membranous, resembling a leaf greatly, and open long previous to maturity, showing the seeds attached to the margin of the leaf and illustrating the structure of fruits, which consist of one or more modified leaves bearing buds (seeds) on their margins.

STERCULIA GUTTATA,[†] *Goldar, Kukar,*

Is worth cultivating for its remarkable fruit, resembling fine peaches in outward appearance, but hard and woody and opening before ripening, like *Sterculia colorata.*

KLEINHOVIA[‡] HOSPITA.[§]

A beautiful tree, which is largely grown with fine effect in the streets and public parks of Calcutta. It has alternate, petiolate, broadly heart-shaped leaves of very thin texture and smooth on both sides, and has large terminal panicles of lively rose-coloured flowers, followed by inflated, turbinate, membranaceous capsules.

The flowers appear early in September and continue during the next three months. It grows rapidly in moist districts, but also thrives in gardens in the dry provinces of India.

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[*] *Colorata*, coloured, of a reddish brown.

[†] *Gutatta*, spotted.

[‡] *Kleinhovia*, after Kleinhoff, once Director of the Botanical Garden, Batavia.

[§] *Hospita*, a guest.

TILIACEÆ.

A very important group of plants, closely allied to, and therefore having in a great measure the same characteristics as, *Malvaceæ*, but distinguished by free stamens. In properties also the relation to *Malvaceæ* may be traced, as the inner bark has a strong fibre, that of two species of Corchorus forming the jute of commerce.

GREWIA* ASIATICA,† *Phulsee, Phulsa.*

A small sub-acid fruit of agreeable quality, useful in preparing cooling drinks during the hot season. Any ordinary garden soil watered occasionally is suitable. In pruning, cut the long shoots well in after the crop is gathered. Propagation of the best sorts is done by layering.

GREWIA TILIÆFOLIA,‡ *Dhaman, Dhamin, Pharsa.*

A very handsome tree with luxuriant foliage and producing very numerous yellow flowers about ½ inch in diameter. It is of special use on the outskirts of the garden as a source of timber for handles to hoes and such like tools: for this purpose branches of suitable thickness should be cut and laid up in store to dry, and when seasoned, it will be found strong and elastic.

CORCHORUS§ OLITORIUS, *Pat, Patta,*

Distinguished from the following by its cylindrical five-celled capsules, and

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* *Grewia*, after Grew, an English physician.

† *Asiatica*, from Asia.

‡ *Tiliæfolia*, lime-tree-leaved.

§ *Corchorus*, a Greek name for a pot herb, from *koreo*, to purge, and *kore*, the pupil.

CORCHORUS CAPSULARIS,* *Ghinalta pat*,

With globular five-celled capsules, are interesting as the source of the valuable fibre, jute, which is grown in Bengal during the rainy season. When in a young state, those species are occasionally used as pot herbs, and should have a place in a corner of the garden where water is abundant. At Vingorla they are to be found growing within reach of the sea water.

LINEÆ, *The Linseed Family*,

Is a small group of plants showing a distinct connection with *Malvaceæ* in its mucilaginous properties and the strong fibre of the inner bark, but distinguishable, for garden purposes by the stamens being 4 to 5 with as many interposed staminodes *(imperfect stamens)* or 8 to 10, rarely more, with the filaments united at the base into a ring.

LINUM† USITATISSIMUM,‡ Flax, Linseed, *Jowus*, *Ulsee*, *Tisi*, *Mashina*, *Utusee*,

Is a pretty little plant in this country, growing about 15 inches high, with a slender stem, straight-edged leaves, and bell-shaped blue flowers. Although a field crop, it may be grown as a bedding plant with pleasure even to one seeking only the satisfaction which bright colour brings, but if we think of the possibility of obtaining improved kinds, and of the importance to youth of familiarity with such objects, quite sufficient reason will be found for giving this modest plant a place in the garden. It may be sown any time between September and November in a deep friable soil ; two or three good waterings at ten days' interval in dry weather are sufficient. In some parts of Europe this plant is sown thickly, grows about 3 feet high, and flax, the basis of linen cloth, is prepared from the inner bark. In this country the plant begins to flower when of such a small size that the flax has not been found of much value, while the seed ripens thoroughly and is valued for the oil it contains, known as linseed oil.

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* *Capsularis*, bearing capsules.

† *Linum*, from Linon, the old Greek name used by Theophrastus.

‡ *Usitatissimum*, most useful.

ERYTHROXYLON* COCA.†

The coca, a masticatory used by South Americans, has lately been introduced into Indian gardens, and as its cultivation presents no particular difficulty, it is possible it may yet rival the familiar *pán*, *Piper betle*. It is a shrub of upright bushy habit with alternate entire ovate leaves about 1½ inches in length and small greenish white flowers. It grows freely if planted in rich loam in a sheltered position and watered enough to keep the soil moist. Propagation may be effected by cuttings planted in a propagating frame.

LINUM GRANDIFLORUM.‡

An annual with bright crimson flowers. Sow in October on a deep friable soil and do not transplant. Water thoroughly once a week and save seed when ripe, as imported seed is seldom of good quality.

REINWARDIA§ TRIGYNA,‖ *Gool ashruf.*

A small shrub with herbaceous branches, dark green leaves, 3 inches by 1, and bright yellow flowers 1 inch in diameter, having three styles and appearing in great profusion in the cold season. The plant is propagated by division, and needs no special culture.

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* *Erythroxylon*, red wood.

† *Coca*, the South American name.

‡ *Grandiflorum*, large-flowered.

§ *Reinwardia*, name after R. G. R. Reinward, Director of the Botanical Garden at Leyden.

‖ *Trigyna*, having the ovary with three divisions.

In the Calcutta Botanical Garden it may be seen planted at the side of a shrubbery with very fine effect in November.

REINWARDIA TETRAGYNA,*

If a distinct species, differs very little from the above, except in the presence of four styles. Its use and culture are similar.

MALPIGHIACEÆ †

Are shrubs or climbing plants, of which a few are very striking ornaments of our gardens.

STIGMAPHYLLON ‡ PERIPLOCIFOLIUM, §

A climber, beautiful whether in flower or not, growing freely from cuttings in any ordinary garden soil freely watered and well drained.

BANISTERIA || LONGIFOLIA

Is a choice climbing shrub with rigid oblong entire leaves. When young it is of a bright bronze colour and furnished with very remarkable spreading hairs, which are attached by a very short stalk in the centre; flowers bright yellow, much resembling the above.

MALPIGHIA¶ COCCIFERA

Is a small shrub with crowded spiny leaves and small pinkish flowers produced in great profusion; from October till December it is of slow growth and very ornamental; the northern side of a house or a tree suits it with ordinary garden

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* *Tetragyna*, having a pistil with four divisions.

† *Malpighiaceæ*, from the genus *malpighia*, after Malpighi, once a Professor of Medicine at Pisa.

‡ *Stigmaphyllon*, having a leaf-like stigma.

§ *Periplocifolium*, in allusion to the stalk being inserted within the margin of some of the leaves and presenting no obstacle in going round.

|| *Banisteria*, after Banister, a traveller in Virginia.

¶ *Coccifera*, having berry-like fruit.

soil and occasional watering in dry weather. Propagated by cuttings in a frame.

GALPHIMI GLAUCA

A shrub 3 to 4 feet in height of upright habit and having opposite entire leaves and small racemes of bright yellow flowers terminating the branches. At Poona it remains in bloom from August till February. Its tidy habit of growth makes it excellent for internal fencing where the climate approaches that of Poona. Propagate by seed.

TRISTELLATEIA[†] AUSTRALASICA.[‡]

A slow-growing climbing shrub having showy yellow flowers followed by fruit consisting of three star-shaped carpels. It grows slowly and flowers freely in the climate of Poona when grown as a pot plant fully exposed and regularly watered. Propagate by seed and layers.

ZYGOPHYLLEÆ, *The Bean Caper Family,*

This group is represented in Indian gardens by

GUAIACUM[§] OFFICINALE.[||]

The Lignum vitæ tree is in Indian gardens a very beautiful shrub with jointed stems, and opposite dark green leaves, each with two pairs of obovate leaflets and pale blue flowers about ½ inch in diameter produced very abundantly during the cold season. The extremely hard wood of this tree is stated in the Pharmacopœia of India to have stimulant, diaphoretic, alterative, and emmenagogue properties, and it thrives

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[*] *Galphimia*, an anagram of *Malpighia*; *glauca*, bluish grey.

[†] *Tristellateia*, in allusion to the three small stars formed by the fruit.

[‡] *Australasica*, from Australia.

[§] *Guaiacum*, from *guaiac*, its South American name.

[||] *Officinale*, directed to be kept in apothecaries' shops.

with ordinary garden treatment at Poona, Bombay, and Calcutta. The feathery habit of the plant is well adapted to stand singly on a lawn, and if planted among other shrubs it becomes lop-sided in seeking the light. Propagation is effected by seeds, which may be obtained from the West Indies.

TRIBULUS[*] CISTOIDES,[†]

Which is said to be a large variety of *Tribulus terrestris*,[‡] *Gokroo*, *Gokhoor*, must be a very pretty plant to grow on rock-work fully exposed to the sun. It has jointed procumbent branches, 1 to 2 feet long, bearing opposite, stipulate, pinnate leaves with 7 to 8 pairs of leaflets, one of which is always smaller than its yoke-fellow. The flowers are described as pseudo-axillary, because the jointed stem is a sympodium, that is, the basal joint only, is the true stem, it is arrested at the first joint, and a *branch*, which rises from the axil of the first stem leaf assumes the place of the stem till the next joint, where it, in its turn, is superseded, and so on. This causes the flowers to be terminal, although apparently axillary.

GERANIACEÆ,[§] *The Crane's Bill Family*,

Is sufficiently well known by the popular garden flowers noted below as a family of highly interesting herbaceous plants, much varied in aspect and chiefly valued in gardens for the beauty of their flowers.

IMPATIENS[||] BALSAMINA,[¶] *Terda, doopati, Gool mendee.*

An annual with showy flowers of many shades from pure white to crimson.

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[*] *Tribulus*, *tries*, three; *bolos*, a point, from the spines on the carpels.

[†] *Cistoides*, resembling the flowers in the genus cistus.

[‡] *Terrestris* of the earth, referring to its creeping habit.

[§] *Geraniaceæ*, from the genus geranium. *Geranion*, the old Greek name used by Dioscorides, from *geranos* a crane.

[||] *Impatiens*, impatient, alluding to the elasticity of the seed-pod, which discharges the seed when ripe.

[¶] *Balsamini*, balsam.

Double-flowered varieties of this beautiful plant are garden favourites and are of easy culture, provided a very rich, friable, open, and thoroughly-drained soil is available ; the soil should be heavily manured for a previous crop, and get an extra dressing of old cowdung and decayed sweepings. The seed may be sown in lines six inches apart, and gradually thinned out as the plants grow until about six inches apart; by this time the first flowers will be seen ; all inferior ones should be pulled out, a dressing of old manure turned in between the remaining plants, and watered liberally if the weather is dry, using liquid manure twice a week. If good plants are still crowded, remove sufficient to give the remainder plenty of room ; the plants removed may be potted or planted in another bed. Save seed from flowers open between November and February, when the wild varieties are not in bloom.

A garden may be kept gay almost throughout the year with balsams only. Sow at intervals of fifteen days from May to January ; two months from sowing the plants are in perfection.

IMPATIENS SULTANI,*

Is a glabrous, erect branched, rather succulent perennial herb having bright scarlet flowers with spreading petals. In our conservatories it is a really beautiful object, thriving among foliage plants and ferns and enlivening the moist conservatory greatly.

IMPATIENS HAWKERII†

Is thus described by W. Bull King's Road, London, who has introduced it in Britain, and it may be expected immediately in Indian gardens, where it is sure to find a congenial home:—

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* *Sultani*, of the Sultan.

† *Hawkerii*, after Lieut. Hawker, who introduced the plant.

"A more lovely flowering plant than this new species it would be difficult to imagine. It is a native of the South Sea Islands where it was discovered by Lieutenant Hawker. The sharply serrate leaves are elliptic acuminate. The magnificent flowers are very large, flatly expanded, and of the most brilliant rich deep carmine colour; this is relieved by a lustrous bluish tinge round the small white eye; the dorsal sepal is roundish and the two lateral lobes oblong and bilobed; the spur is red and about two inches long. The handsome flowers of this superb new *Impatiens* are produced in the greatest profusion from March until October; the plant is of free growth and of good habit, and cannot fail to become one of the most useful of decorative plants."

BEDDING PELARGONIUMS,* *Pelargonium inquinans.*†

Many varieties of Pelargoniums thrive well throughout the Deccan and the Mysore country, while on the Neilgherries they form large bushes; but success is not generally met with in some parts of the country where the rainfall is heavy, because heavy rain during hot weather causes rapid decay. The plants referred to in this chapter are what are known in Britain as scarlet geraniums, although the flowers vary in colour from pure white to intense scarlet. The leaves are nearly circular, soft, velvety, and having large blunt teeth on the margin which are again toothed (bicrenate).

To grow Pelargoniums, the soil must be thoroughly well worked, turned over frequently, and enriched with decayed manure of any kind. Cuttings should be struck during the cold season in pots, and at the beginning of the rains planted out where they are to bloom. A few cuttings only should be put into each pot, as, if the roots get broken, the plants do not take freely to their fresh quarters. Some of the kinds that grow lanky and straggling should be pruned freely during the cold season, and afterwards kept dry for a few weeks until they have thrown out fresh shoots. When they have made a second season's growth, it is better to take off the cuttings and throw out the old stump, as old age affects their vigour. Very good varieties may sometimes be obtained from seed which may be sown at any time during the rains.

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* *Pelargonium*, from *Pelargos*, a stork, referring to the length of the fruit.

† *Inquinans*, stained flowered.

In the districts where the rainfall is too great to permit to be kept throughout the year, very ornamental beds may be prepared by obtaining cuttings from Poona or Bangalore in October, which may be at once planted where they are required to bloom in soil that has been thoroughly worked and enriched with old manure, a little fine sand being run in as the cutting is put in its place, and a few green branches inserted to give shade for some days. If this has been skilfully managed the plants begin to bloom almost at once, and give much satisfaction during the cold season.

The varieties under this head are very numerous, and year by year fresh sorts are introduced. For lists of desirable sorts that are available for the time being the catalogues published by all enterprising nursery men should be consulted.

PELARGONIUM ZONALE,* *Zonal or Horse-shoe Pelargoniums.*

The varieties of this species are easily distinguished by the horse-shoe-like marking on the leaf, which may be dark-brown or golden or brown and golden, the latter forming the section known as *Tricolor Pelargoniums.* These are more delicate in this climate, standing heat less. They thrive grandly at

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* *Zonale,* zonal.

Bangalore and Ootacamund, but are not as satisfactory at less favoured stations.

IVY-LEAVED PELARGONIUMS, *Pelargonium peltatum** *or Pelargonium lateripes.*

The varieties of this species are capable of very successful treatment almost throughout India. If grown in pots and the pot inserted in a hollow stump of timber the effect of their trailing stems and bright glossy ivy-like leaves is very fine.

A rich friable soil thoroughly drained, slight shade, protection from hot winds, and frequent watering are the conditions they thrive under. The following from the list of Mr. W. Bull King's Road, Chelsea, includes the finest:—

PELARGONIUM LATERIPES,† *Ivy-leaved Pelargoniums.*—On account of their graceful drooping growth are extremely useful for vases and rustic or suspended brackets. The rich wax-like foliage alone is ornamental, but in addition the flowers are pretty and the different varieties present a contrast and charm obtained by few other plants.

BEAUTE DE LYON.— A beautiful variety; flowers of a bright scarlet colour with purple shade.

BUTTERFLY.—Bright rose, striped with crimson on upper petals and blotched with rosy violet.

CAPTIVE.—Rose, marked with pink on the upper petals and feathered with carmine.

CASSIDY.—Rose-pink with white centre; blotched on upper petals with purplish crimson.

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* *Peltatum*, having the stalk of the leaf within the margin, from *pelta*, a shield.

† *Lateripes*, from *later*, a tile.

CEDARO.—Deep rose shaded with purple; upper petals feathered with crimson and white.

COLONEL ROUDAIRE.—Large fiery-red flowers.

DUCHESSE.—Violet-pink, feathered with bright red on the upper petals.

ESPOIR.—Rosy pink; upper petals barred with dark crimson; large flower.

FLORINDA.—Delicate pink, with white centre; upper petals marked with purplish crimson.

FUTURE FAME.—Flowers borne in immense trusses, being individually of very large size and of a most pleasing brilliant amaranth-purple colour. It was awarded a First Class Certificate by the Floral Committee in recognition of its superior merit.

MASTERPIECE.—A very large and fine flower of a beautiful rich magenta-crimson colour.

MEDINA.—Bright rosy lavender with white centre; the upper petals marked with violet-rose.

MORA.—A large flower of a soft pink colour with crimson marking on the upper petals.

MULTIFLORE.—Fine trusses of large flowers of a beautiful bright rose colour.

PERA.—Delicate blush; the upper petals blotched and feathered with rich purplish crimson.

RUPERT.—Rosy carmine shaded with magenta; upper petals barred with dark crimson.

SHOWY AND FANCY PELARGONIUMS OF FLORISTS.

This section is more shy of flowering in the hot parts of India than the others, but at Ootacamund, altitude about 6,000 feet, they flower as freely as the other sorts.

SWEET-SCENTED PELARGONIUMS, *Pelargonium radula,*[*]

Has leaves on rather long petioles, *palmati partite;* roughly hisped above and softly pubescent beneath; lobes narrow, linear *pinnatifid* with revolute margins. This fine plant thrives with ordinary garden treatment in the dry parts of India, and, like the other sorts, is propagated by cuttings; the flowers are rarely seen.

PELARGONIUM QUERCIFOLIUM,[†] *Oak-leaf Pelargonium.*

With strongly-scented leaves, shortly petiolate, cordate at base, *sinuato-pinnatifid,* hairy, with lobes and sinews rounded, and margins wavy and crenated. This plant is very satisfactory if grown where it may be protected from full sunshine on a bank of earth having abundant lime rubbish in it and regularly watered.

OXALIS,[‡] *Amrool, Chukrika.*

Several species of this genus are lovely little plants with trefoil or quadrifoil leaves, folding downwards at night. The flowers are of many tints of rose, yellow, or white; and any light rich soil with plenty of water during the rains and none during the dry season is suitable. Propagate by separating the bulbs.

BIOPHYTUM[§] SENSITIVUM,[||] *Lalchana,*

Is not often found in gardens, but few plants repay the thoughtful observer more. It is a delicate little plant four inches high, with leaves composed of numerous small oblong leaflets arranged in pairs on a central stalk and are highly sensitive. The flowers are yellow or purple, ¼ inch diameter, and show a remarkable arrangement for assisting cross fertilisation ; the relative length of the stamens and styles varies in different flowers. The plant likes a dry bank with a poor soil, and no more water than nature provides in the Deccan.

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[*] *Radula*, a scraper, from the form of the leaf.

[†] *Quercifolium*, oak-tree-leaved.

[‡] *Oxalis*, *oxys*, acid, referring to the taste of the leaves.

[§] *Biophytum*, *bios*, life; *phuton*, a plant—from the movement of the plant when touched.

[||] *Sensitivum*, sensitive.

TROPÆOLUM* MINUS,†

In districts of scanty rainfall if sown in June or July and in November and December and in moist districts at the latter season only ; on a bed of rich well-drained earth, watered sufficiently to keep the soil moist, makes a very showy bed ; it is better to avoid transplanting. The seed may be sown in lines six inches apart, and thinned if in danger of crowding.

TROPÆOLUM MAJUS,‡ *The Climbing Nasturtium,*

Should be sown during the cold season ; it thrives at hill stations better than in the plains.

HYDROCERA§ TRIFLORA,|| *Neer ganaroo,*

A beautiful annual found in marshy places and the margins of ponds in Bengal. The leaves are linear, lanceolate, and serrate and the peduncles three-flowered : the flowers are one inch in diameter and variegated with white, red, and yellow. It is propagated by seed and cuttings.

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* *Tropæolum,* from *tropiaon,* a trophy, the leaves being of the form of a buckler and the flowers resemble an empty helmet.

† *Minus,* the smaller.

‡ *Majus,* the greater.

§ *Hydrocera, hudor,* water; *cera,* wax—used in encaustic painting.

|| *Triflora,* having flowers in threes.

RUTACEÆ,[*] *The Rue and Orange Family,*

Consists of trees and shrubs with compound leaves furnished with glands filled with essential oil, which gives a characteristic odour to the various members of the family. A rapid loss of germinating power in the seed is common in this family, and also in the myrtle or jambool tribe, another family having oil glands in the leaves, therefore it is advisable to sow seeds of these families when freshly gathered.

CITRUS[†] AURANTIUM,[‡] *The Orange*, Climate, and Soil.

This valuable fruit succeeds admirably in the dry parts of India, such as the Deccan, Mysore, and Central India, but does not yield good fruit in low-lying moist districts.

A deep alluvial soil containing about 5 per cent. of lime in a minute state of division is the most suitable, but a soil formed of decayed trap at least three feet in depth and the rock substratum of an open porous nature which will permit excess of water to pass downwards and draw air into the soil, is also excellent for this crop. A tenacious soil is not desirable for the orange tree.

BUDDING THE ORANGE.

The orange does not grow freely or make a handsome tree when on its own roots, therefore it should be budded on a citron or sweet-lime stock. The budding may be performed at any time when the stock is growing freely, but the beginning of the rains is the most favourable time. Budded plants can be obtained from nurserymen who have established a trade in plants near all our large cities, and in some instances from the public gardens. The price asked at Poona is about Rs. 25 per 100 for good plants. When these are procured, it is very necessary to see that they really are budded, and then to keep down the shoots from the lime stock, which, if allowed, it throws up with great vigour. During the first few years the trees should be looked over frequently, and any shoots that have thorns should be traced to their source, when it will be found they come from the stock; these must be cut away close to the main stem of the plant.

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[*] *Rutaceæ*, from the genus *ruta*, from the old greek name *rute*, probably from *ruomai*, to preserve, in allusion to the effects of the plant on health.

[†] *Citrus*, from the Greek *kitron*.

[‡] *Aurantium*, golden.

TO RAISE ORANGE STOCKS.

In November the fruit of the large rough-skinned sour lime, called *jumbooree* or *jumbira*, is plentiful. Get some that have been allowed to ripen well on the tree and keeping them about ten days to complete the ripening.

In the meanwhile get ready a bed of thoroughly friable soil in a slightly shady place and manure heavily with leaf mould. Take out the seeds and sow them in lines 6 inches apart. The seed will germinate very soon, and if carefully looked after will be 6 inches high and ready to transplant to another place where they should stand one foot apart. By July or August next the plants will be 3 feet high and ready to bud. See that the tree the buds are taken from bears first class fruit. Read the instructions on BUDDING at page 63 carefully. In the orange extra care needs to be applied to prevent the cross cut from going too deeply—it should be through the bark only, otherwise the flow of sap is arrested and a cicatrix forms, which is injurious. Native grafters have an ingenious method of avoiding this; they make only one slit, the vertical one, and by bending the stock over towards the cut make it gape open. The bud is then slipped into the gap, and the stock being released, it springs up, holding the bud in its place. A slight bandage with *sopat* is then applied.

TO MAKE A PLANTATION OF ORANGE TREES

The soil should be enriched with a heavy manuring of street-sweepings and cowdung which have been kept in a moist pit for some months and spread on the surface 2 inches deep. The soil should then be dug or trenched 18 inches deep and arranged for irrigation, and a crop of cauliflower, potatoes, or some crop of that nature which will repay the heavy manuring and digging. The young orange trees should be planted in straight lines ten feet apart among the other crop and carefully watched during the first year or two to see that shoots do not come from below the graft; if any appear, they must be rubbed off. The ground should be carefully worked with a variety of crops needing irrigation during the first five years, while the orange trees are gradually occupying the soil.

At Nagpore the management of the orange is well understood, and the system is thus described to me by Mr. Mahaluxmivalla, the able Superintendent of the Public Garden at that station. Assuming that we have established trees five or more years from the graft, in March watering is gradually lessened and is completely stopped by the middle of May. The earth is then opened up round the roots, manure (well decayed bullock or cowdung) is heavily applied (3 inches in depth), and the roots covered up with fresh soil. All the leaves now drop off, and at the beginning of the monsoon (or earlier if the trees are artificially watered, as is sometimes done) the tree is full of flowers and new young leaves; this is the *mirag bahar* or first rain flowering at the end of June. The fruit from this flowering ripens between February and May and is the finer of the two seasons.

A second flowering takes place nearly at the same time as the mango tree flowers, in February and March, and are called the *ambia bahar.* The fruit from this flowering ripens from December to February. For this the resting and manuring is done in December.

It is not advisable to let the same tree carry both crops because it would interfere with the hot season resting and exhaust the tree.

INSECT ENEMIES OF THE ORANGE TREE.

In this country the most serious enemy is a large grub, which bores into the tree, leaving evidence of its presence by a lot of sawdust-like chips joined together by threads like spider's web. The tree should be gone over carefully with one of the small glass syringes that are plentiful in the bazaars and a mixture of one-fourth kerosine oil and three-fourths soapy water well stirred up. If this mixture is squirted into each hole the grub will come to the mouth and may be drawn out by a pin or babul thorn.

WATERING AND PRUNING THE ORANGE.

Young orange trees should be watered once in three days, until they have taken possession of their new quarters and begin to grow freely; after that, once in ten days will be sufficient during hot dry weather. Established trees in a growing state should be watered sufficiently to keep the soil moist to a depth of three feet. The quantity of water required will depend much on the nature of the soil—from 3 to 4 inches per month will be sufficient if given in two or three waterings. Little pruning is necessary for orange trees, but weakly or dead shoots should be cut out, and extra luxuriant shoots should have the tips taken off to keep the tree in a regular shape and cause an equal distribution of the sap.

WHAT STOCK SHOULD BE USED FOR THE ORANGE.

Much has been written regarding the sweet lime as a stock for orange trees, and nearly all who notice the subject take it for granted that it will increase the sweetness of an orange. Practical experience in this matter is difficult to attain. My own experiments were rendered completely futile by the necessity for furlough after some years of care and attention had been devoted to them, and I have been very carefully searching for any definite results on this subject attained by others but without success. Considered from a theoretical point of view, no results, as far as sweetening the fruit, are to be expected. The material which forms the sugar in the fruit is derived from carbonic acid and water: carbonic acid is taken up chiefly by the leaves—a small portion of it—and all, or nearly all, the water is taken up by the root, but the conversion into sugar is done in the leaves and stem. The leaves of a grafted orange tree are the leaves of the particular variety of orange cultivated and not the leaves of the stock it may be grafted upon. Now, as it must be admitted that assimilation takes place in the leaves, what effect can the root only of a sweet-fruited variety have upon the fruits, especially as the original root has been almost completely superseded by growth produced from the leaves of the variety grafted upon it. No doubt many roots retain the characteristics of their species, although another may be grafted on them, still in what way this will add to the sweetness of a fruit is difficult to see.

The sweet lime is a more delicate plant than the *Jumbooree* and much slower in growth, and if it has any influence will be as likely to exert it in this direction as any other.

The superiority of the Nagpur orange was long attributed to its being grafted on the sweet lime. I searched one of the principal gardens at Nagpur for evidence on this subject.

Jumbooree plants for stocks were abundant, and in the few instances in which trees in bearing had sent out suckers from the root they were of the *Jumbooree* stock. Oranges as fine in size and sweetness as any at Nagpur are produced at times in private gardens at Poona, where there can be no doubt about the stock being the *Jumbooree.*

So much has been said, not with the intention of upholding the *Jumbooree* stock, if a better can be found, but to show *how little is known* on the subject and what a difficult question the effect of the stock on the graft is, and incite very carefully made experiments to settle this much-disputed and important question. The same question disturbs cultivators in all parts of the world, and in India we have a grand opportunity of producing excellent practical results of value far beyond the local sphere of the experiments ; but to be of value the most ample proofs must be shown. Hitherto on this question dogmatic assertion has unfortunately held sway and scientific demonstration has been neglected. The object might be attained in our public gardens by preparing a large number of stocks from all the varieties of oranges and limes procurable. To these stocks indelible labels made of small pieces of copper stamped with numbers corresponding with entries in a register should be affixed, and when ready for budding a set of all the varieties of orange and lime procurable should be budded and planted out under similar conditions. If sets of these plants were distributed for planting in other gardens reliable data to base assertions upon may be obtained. The mango might be taken as an example in dealing with this question. It is well known that seedling mangoes vary to a great extent in sweetness and other characters. Has any one met with distinct variations of a particular variety which could be ascribed to the particular stock ? In my orchard of 200 bearing trees no such difference is to be found.

VARIETIES OF ORANGE AND LIME CULTIVATED IN INDIA.

THE LADOO ORANGE OF THE DECCAN.

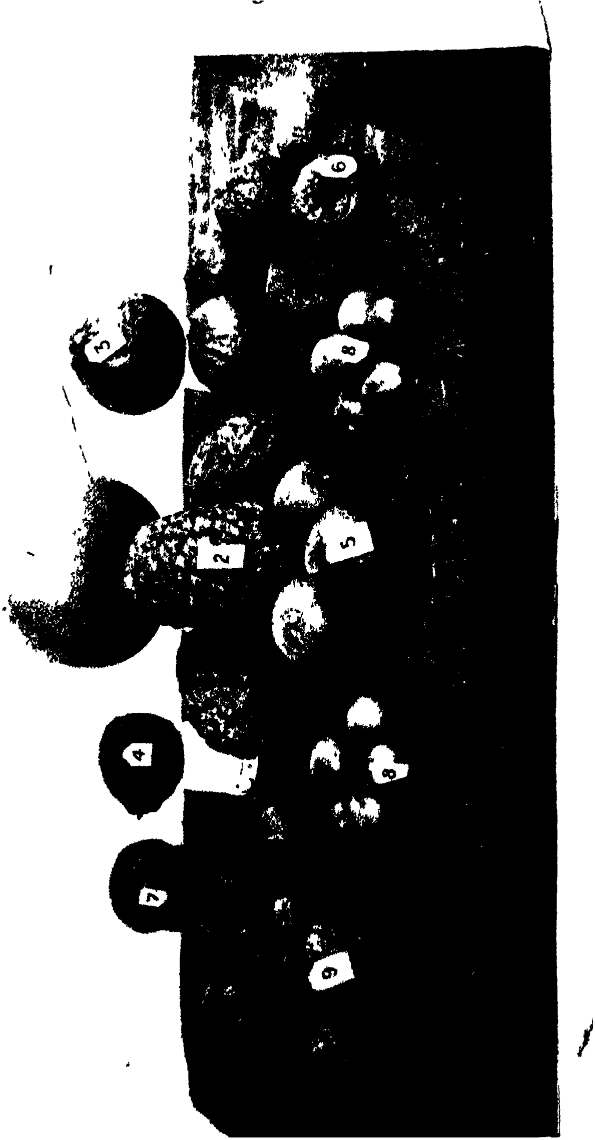
A VARIETY averaging in good specimens 8 oz. in weight, but often gathered half grown and brought to market in the bitter state for use in confectionery. Shape, a much depressed sphere with a distinct papilla at the stalk; skin, moderately rough and loose, of a dusky yellow colour, and medium thickness; endocarp very thin and enclosing juicy sweet pulp of piquant flavour; in colour of the medium tint that may be called the typical colour of orange pulp, being the same colour as the St. Michael's and the Cintra, and several shades darker than the Malta and Mozambique and lighter than Kowla. This is a really fine orange, which is not very popular on account of the indifferent appearance of its skin, but its pulp is finer than that of its showy relative, the Mandarine.

A remarkable malformation occurs in many of the fruits of this variety; at the stigma end within the skin an extra orange, as large as a marble, distinctly formed, with 5 to 7 carpels, may be found.

Leaves from 1½ by ¾ to 2½ by 1¼ with the winged joint very slightly developed as in *Cintra*, *Kowla,* and *Meeta Limboo.* Flowers, 5 petals, ¾ inch in diameter.

Stamens 20 to 24; carpels 9 to 10.

The *habit* of the tree is long, straight branches, as in Cintra and Kowla, but spreading more than in the fastigiate manner of those varieties. The largest orange tree I have seen in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the Deccan is of this variety. One healthy tree in Sir A. Sassoon's garden at Poona, which was planted 20 years ago, covers 400 square feet.

"CINTRA" ORANGE, *Loose-skinned.*

No. 9 *in Illustration, page* 192.

From the name this orange has long been assumed to be of Portuguese origin, but lately Bonavia has contended that it is a corruption of a Sanskrit word and should be spelled Suntura. It is undoubtedly the finest orange in cultivation in India, and the fact that it flowers at two distinct seasons, January and July, and will ripen fruit accordingly, would seem to point to some other climate than the plains of India as its original home; but if permitted to bear two crops of fruit neither attain perfection, and the chief advantage the Nagpur cultivators have in growing this orange is the habit of setting distinctly to rest separate brakes of the trees about November and March, thereby ensuring one good crop from each brake instead of two imperfect crops.

This fruit is to be found 10 oz. in weight, but ordinary specimens weigh about 7 oz. The skin is smooth, in one variety very loose, in another tightly fitting the pulp; the loose-skinned variety has a corrugated nipple rising from a circular depression on the stalk end and the stigma end depressed and rougher than the sides.

Carpels 9 to 10, endocarp thin, seeds about 20, pulp sweet and of typical colour.

Flowers and leaves as in *Ladoo.*

KOWLA ORANGE.

No. 6 *in Illustration, page* 192.

In the absence of fruit this tree is indistinguishable from Cintra, yet the fruit is very different. Average weight of good specimens 6 ozs., becoming yellow on the tree before it is sweet and therefore called *teeka pukka*. Skin, dark orange when ripe, rough with several irregular vertical ridges, and a circular channel enclosing a space one inch in diameter, containing raised irregular papillæ on the stigma end. Carpels 10, endocarp strong, and the pulp of a deep orange colour. An indifferent dessert fruit.

MANDARINE ORANGE, as found in the Deccan, *Lall Ladoo.*

Average weight, 7 ozs.; form, a depressed sphere with slight papilla at the stalk, and a hollow on the stigma end; skin smooth, polished, with small regular punctures, loose, and of a deep orange colour; endocarp of medium strength; the juice cells transverse and separating freely; pulp of medium colour (a brownish yellow); flavour very good. Leaves and habit as in *Ladoo*.

Flowers.—Carpels 11; seeds on an average 20.

Cultivated generally in the Deccan and at Lucknow.

In season, November, December, January.

A very handsome fruit with its bright colour and regular form, but with a stronger endocarp and inferior in flavour to its plain-looking sister, *Ladoo.*

MOZAMBIQUE ORANGE, variety *Kaguzee.*

No. 5 in Illustration, page 192.

Average weight, 10 oz.; specimens weighing 13 oz. are plentiful; shape globular, slightly compressed vertically; skin, medium thickness, tight, marked by numerous vertical furrows and a distinct circular smooth mark 1 inch in diameter on the stigma end; pulp generally pale yellow, but when fully ripe of the normal brownish yellow tint; endocarp strong, so that the orange can only be sucked; juice sweet but without piquancy.

The leaves are from 2½ by 1¼ to 5½ by 3¼ inches; entirely or very slightly and irregularly serrate; apex acuminate or emarginate; petiole, ¾ inch; the winged joint attaining ¼ inch in width, often less, and in some of the larger leaves wanting.

Flowers, 1½ inches in diameter of 5 slightly oblique petals, glandular on the outside. Stamens 20 to 24.

MOZAMBIQUE ORANGE, variety *Goradiya*,

Is the same as the above, except that the skin is thicker.

THE ST. MICHAEL'S ORANGE.

Globular in form and averaging 7 ounces in weight; moderately smooth; thick tight skin; carpels 10 to 12; pulp of medium orange hue; sweet; centre full of pith; leaves from 1¾ by ¾ to 3 by 1½ inches; quite entire. Cultivated at Mopani and, no doubt, other places in the Central Provinces. The popular orange of the British markets.

MALTA ORANGE.

Shape globular, large, average 10 oz.; skin medium smooth; green or pale yellow when ripe; thick endocarp; strong flesh, pale orange, sweet. It is much grown at Lucknow, and plants are procurable from the Horticultural Gardens at that station.

RESEMEE NARANGEE.

Fruit average 3 ounces in weight; form, oblate sphere; skin loose, thick in proportion to the size of the fruit; colour deep orange; pulp sweet but sparse and full of seeds; carpels, 10 to 12; seeds average 20.

Habit, a dwarf, very ramose tree resembling the *Khaguzee Limboo.** The poorest variety of orange I know of. The seeds occupy nearly the whole of the little carpels. I think this must be near the wild type. Cultivated at Poona and Sheveroy Hills.

Khaguzee Limboo, No. 8 in illustration.

BITTER SEVILLE ORANGE.

Average 7 ounces in weight; skin, smooth, thick, very pithy on the inside and marked on the stigma end by a circle about an inch in diameter, resembling the mark found on the Mozambique; pulp pale yellow; juice copious but acid.

Leaves 3½ by 2 inches, petiole 1 inch, the winged joint slightly developed. Cultivated on the Sheveroy and Panchgani hills and used in the preparation of marmalade.

MALOONGEE.

No. 2 in Illustration, page 192.

A low-spreading shrub bearing fruit attaining 4 lbs. in weight, of an oblong shape, irregularly ridged and wrinkled, the surface smooth, with prominent convex oil glands and a small papilla at the stigma end. The skin, 1½ inches in thickness, is firm and solid, enclosing 10 carpels having a pale-coloured pulp between very strong endocarpal layers and with scanty bitter acid juice and about 100 seeds, which are small in proportion to the size of the fruit, but generally contain several embryos, as in many other seeds of this genus.

LEMON-SHAPED LIME, *Pati nimboo, Karna.*

Fruit oval, 3½ ounces in weight; 2¼ to 3 inches by 1¾; apex and base with papilæ; skin smooth and yellow when ripe; juice very acid and abundant; carpels 10 to 12; seeds, about 20. Leaves 2 by 1 to 2½ by 1¼ inches, petiole ½ inch, the winged joint attaining ¼ inch. Flowers of 4 petals, ¾ inch in diameter with 22 to 25 stamens. Habit, a vigorous-growing tree with spreading branches. Cultivated at Gangawara, Central India, and sparingly throughout the Deccan.

THE SWEET LIME, *Meeta Limboo* or *Sakar Limboo,*

Average weight, 6 oz.; form globular, sometimes extending vertically. Skin very thin, tight, smooth, and of a greenish yellow and ultimately pale yellow. Carpels 11 to 12; seeds, average 10; paler and less plump than orange seeds, longer pulp, very pale in colour, and abounding in a sweet mawkish juice.

Leaves up to 3½ × 2¼ inches; petiole up to ½ inch; slightly and irregularly serrate crenate; thorns, ¼ inch.

Cultivated in Deccan and Central India.

CITRUS DECUMANA,* The Pumalo, *Shaddock*, *Popanus*, *Batavi niboo.*

No. 1 *in Illustration, page* 192.

This beautiful tree, whether perfuming the air with its rich waxy flowers or gladdening the eye with its massive fruit, is one of the most striking and agreeable objects in the garden. The fruit attains 4 lbs. in weight and 7 inches in diameter, in form globular, skin smooth in comparison with others of its tribe, but roughened by the oil glands and without other constant markings, from ¼ to 1 inch in thickness, carpels 14 to 15, pulp varying in colour from that of a common orange to a deep carmine; seed, with only one embryo; leaves from 2½ by 1½ inches to 5 by 2½ inches; petiole having the winged joint varying from ⅛ inch to 1½ inches in breadth. It thrives well in the Deccan, but better where the moist heat of the Concan proves detrimental to its relative, the orange, and enjoys a richer soil than the orange will fruit in. Old building materials, such as broken bricks and mortar, mixed with well-decayed cowdung, are excellent manures for this tree, as it delights in a rich porous soil and an ample supply of water with thorough drainage. It is not necessary or desirable to dry up this tree to induce flowering, but at the beginning of January each tree should have a good supply of old manure dug in near its roots: it will flower freely during the cold season and again at the beginning of the rainy season, a few flowers appearing at times between those seasons. A very fine-flavoured seedless variety is in cultivation, but it seldom finds its way to the bazaars.

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* *Decumana*, huge.

Propagation is generally done by budding on the common citron, *Jumbooree*, a tree which yields a large coarse fruit that is used by dyers for the acid it contains; the seedling pumalo also makes a good stock. Very little pruning is required, but all weakly or decaying shoots should be cut out and the bunches of fruit should be thinned out as soon as the pumaloes reach the size of marbles, till at most one fruit remains for each small branch; but if there are still more than one to each branch, it is advisable to thin out still further. The fruit should be supported, so that its weight may not bend down the branch and impede the flow of the sap.

CITRUS JAPONICA,* *The Kumquat.*

This small species of lime is occasionally to be met with in botanical gardens, where it is desirable to grow specimens of every plant that can be cultivated either for use or ornament. In the plains it is very delicate, but at an altitude of 4,000 feet thrives freely. It may be propagated by budding on the small lime, *Kaghuzee Limboo*, or on the *Jumbooree.*

MURRAYA† EXOTICA,‡ *Norga golunga, Kaminee.*

A very fine shrub with alternate, impari-pinnate leaves, having 5 to 7 leaflets, usually of a dark glossy green, and throwing its pure white sweet-smelling flowers into relief during two seasons, one in December or January and another at the beginning of the rainy season, as is common in this family.

Propagation is effected by seed and layers.

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* *Japonica*, from Japan.

† *Murraya*, named after John Andrew Murray, a Swedish botanist, 1740-1791.

‡ *Exotica*, exotic.

CLAUSENA[*] WAMPI,[†] *The Wampi Fruit.*

This small tree has long been known in our gardens as *Cookia punctata.* It has pinnate leaves of about seven ovate-lanceolate, acute leaflets, slightly unequal at the base and panicles of small white flowers producing edible fruit as large as a pigeon's egg ; smooth and of a yellow colour and useful for preserves. At Poona the wampi thrives in a loamy soil irrigated occasionally and is propagated from seed or layers.

LIMONIA[‡] SPECTABILIS.[§]

A small shrub, with leaves divided into 3 leaflets and rose-coloured flowers. Any fine garden soil, with regular watering and good drainage, will grow this beautiful shrub. Propagate from seeds, which must be sown while fresh, or layers. It thrives particularly well in Bombay and evidently enjoys a moist atmosphere.

RUTA GRAVEOLENS,[‖] *Rue, Sudal, Satoori.*

Beyond ordinary soil and occasional watering, needs no special culture. Propagate by division and by seeds.

FERONIA[¶] ELEPHANTUM, Elephant or Wood Apple, *Kowat, Kavit, Rathbel, Yellunga, Valunga,*

A very handsome erect-growing tree, thorny in a young state, armed with strong straight axillary thorns, and bearing alternate leaves of 5 to 7 leaflets, having minute oil guards, which appear as semi-transparent spots, and smelling of aniseed. The fruit is the size of a cricket ball, dull grey in colour, and edible. This tree is of slow growth, but otherwise is suitable for roadside purposes if planted alternately with some quick-growing but short-lived tree. In planting this tree a hole 4 feet deep should be prepared, the lower half filled with stones and sweepings, the upper with good soil and seeds sown where the tree is wanted to remain so as to avoid transplanting.

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[*] *Clausena,* commemorative of P. Clausön, a Danish botanist of the 17th century.

[†] *Wampi,* the vernacular name.

[‡] *Limonia,* from *Limuna,* the Persian name of the citron.

[§] *Spectabilis,* worth seeing.

[‖] *Graveolens,* heavy-smelling.

[¶] *Feronia,* after Feronia, a Roman goddess.

To ripen properly the fruit needs to be exposed to the sun during about 10 to 15 days after gathering.

ÆGLE[*] MARMELOS,[†] *Bael, Bela maredoo, Willa maroum.*

On a deep soil slightly irrigated while the tree is young the *bael* forms a hardy small tree. The pulp of the fruit is a well known valuable remedy in dysentery and the tree is well adapted for fences in open stony ground. Propagation [is effected by seed.

AMPELIDEÆ, *The Vine Family,*

Includes the well known Grape Vine and a few beautiful climbers.

VITIS[‡] VINIFERA,[§] *The Grape,* Angoor.

The Grape Vine grows most luxuriantly in an open, very friable, loamy soil; but if the soil available has given good crops of field or garden produce, and is freely manured with decayed sweepings from the garden and stable, it is likely to have the conditions desirable. A soil that has not been proved good by previous work should not be entrusted with this important crop. Shelter from strong winds is desirable, and as the fruit does not develop properly when fully exposed to the sun, the branches should be trained so as to shade it. The vine will not ripen fruit if the atmosphere is moist, such as is the case in the Concan and other low-lying places; the atmosphere in the Deccan even is too moist during the early part of the rains. Immediately after the fruit is cut, the growth of the vine should be finished for the season. At this time water should be withheld and the fruit-bearing shoots cut back to within two buds of their origin.

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[*] *Ægle,* one of the Hesperides.

[†] *Marmelos,* from *marmelo,* the quince.

[‡] *Vitis,* the name used by Virgil from *vieo* to bind, in allusion to its clinging character.

[§] *Vinifera,* wine-bearing.

Thinning out the berries, as is done in Europe, is seldom practised, but its effect cannot be otherwise than beneficial in increasing the size of the grapes and the beauty of the bunch.

To Propagate the Vine.

Cuttings of well ripened wood inserted in sandy loam during October or November root freely, and if transplanted with care to carefully prepared beds of rich soil and set out one foot apart will attain size sufficient for making permanent plantations during the following July. The proper size of cutting for the vine has been the subject of much controversy, and in Britain cuttings having only one eye or bud are admitted to be the best, because plants raised from such cuttings (called eyes) are shorter-jointed than others, and when a plant is grown under glass and consequently in less light than in the open air the tendancy is to lengthen the joint or internode, therefore means of counteracting the effects of decreased light were desirable. Such means are not necessary in this climate, and as the one-eyed cuttings are more difficult to manage than cuttings of 3 to 4 buds it will be better to adopt the long cuttings, as is customary in this and other warm countries.

To prepare the Ground for a Vine Plantation.

Having selected a plot that has been proved to be first-rate soil for general purposes and in consistence tenacious enough to mould easily in the hand when moist and yet would not firmly retain its form when dried in the sun and drained so effectually that there may be no danger of water stagnating in the soil, at the same time the level should be such that very little or no water will run off the surface, but as much as possible go slowly through the soil.

MANURE SHOULD BE APPLIED AT THE RATE OF

	30 tons	per	acre	of	old cowdung,
or	40	,,	,,	,,	decayed town sweepings,
and	4	,,	,,	,,	bones roughly broken with a hammer,
or	1	,,	,,	,,	½ inch bones,
and	4 cwts.	,,		,,	saltpetre,

and the soil thoroughly ploughed or dug eighteen inches deep and laid out for irrigation.

The vines may be planted out in lines 8 feet apart with the same distance between the plants in the line and the intervening space planted with any crop that may be in local demand and needing irrigation, for instance, beet, knol-kohl, spinach, lettuce, and such crops which do not grow high, so as to keep the light from the young vines. If the vines have grown properly by September supports will be needed; for this purpose there are few plants better than "Pangara," *Erythrina Indica*, because large cuttings strike root freely and remain firm and safe from white-ants. Those supporting plants must be kept within bounds by frequent pruning. To raise the supports at the beginning of August plant straight cuttings of *pangara* 6 feet in length to a depth of one foot and one foot distant from the vine. By September the cuttings will be rooted and the vines may be tied up to the *pangara.*

The vine plant at this stage should be one simple stem without branches. If it has been broken and branched near the base, it will be advisable to cut back to a strong bud beneath the branches and lead out a new shoot to form the main stem, which should be stopped about a foot above the end of the support. Several branches will appear there, and much skill can be applied in their regular disposition, so that all may not be on one side, but at regular intervals and surrounding the stem: this is to be attained by rubbing out superfluous buds. Those side shoots are important because they are to bear the fruit, and its development is favoured by the regularity of the disposition of the branches which permits an equal flow of the sap to each. Six main branches may be retained at a distance apart on the stem as near to four inches as is practicable—this takes up two feet of the upper part of the stem—and if the branches are trained to radiate in different directions there is no overcrowding and a balance is maintained. Each of those branches should bear 3 bunches of grapes and should be supported by turning in the end after it has grown 4 feet and making it fast to the support. At the hot season pruning, after the fruit is gathered, it is intended to cut off the reversed portion, leaving the fruit-bearing branches two feet in length.

Some flowers will probably appear during the first year and a small quantity of badly developed fruit might be ripened, but more profit will be ultimately obtained by picking off the flowers as soon as they are seen and allowing the energy of the plant to go to form a well developed set of branches capable of bearing fruit in quantity during succeeding years.

RENEWAL OF BEARING WOOD.

The main branches will bear healthy fruit spurs about three years, and a look-out for fresh branches in suitable positions should always be maintained, so that worn out ones may be cut out gradually and a full supply of bearing wood maintained.

THE HOT SEASON PRUNING OF THE VINE.

WHILE the fruit is ripening water should be gradually reduced, so that by the time the fruit is cut the leaves have mostly turned yellow, and a few days' more drought will cause the greater part to fall off. This is the chief pruning time: the fruit-bearing branches should be cut back to two feet in length. It is not from those branches directly, but from short branches to be developed on them, called spurs, that fruit is to be expected in future seasons. Loose bark should be peeled off because it harbours insects, and a thorough coating of the mixture of earth and cowdung, which people use for their floors, should be given to destroy the eggs of some insects already deposited and prevent the deposition of others. At the same time the soil should be dug thoroughly, except a space of about 3 feet round each vine, where the main roots are abundant which are to furnish the young feeding roots during next season; this part should be gently forked over and any weeds cleared.

The remainder of the ground should be full of fine roots, and the digging has a beneficial action by breaking those roots and sending the plant more completely to rest. When the pruning and digging are finished a heavy dressing of manure should be given. Poudrette is the best at this stage: it is used largely at Nassick, where grapes are grown in a large quantity; the fact that the sort grown at that station is not a fine one does not affect the question of the suitability of this manure.

The ground should then be rearranged for irrigation and left to wait the advent of the rainy season, that is, if the plants will remain so long without starting into growth, but oftener they anticipate the monsoon by bursting into leaf, and if water is withheld then injury is caused. Growth once started must be kept up steadily. When a few leaves have appeared on the new shoots flower will be seen, which would, if allowed to remain, produce small bunches of sour berries at the end of the rainy season and cause a deficiency during the hot season, when ripe fruit might be expected.

The development of foliage should be fully encouraged at this time, because then the leaves are laying up the store of material to be afterwards formed into grapes ; the branches being tied in gently to give support during strong winds. At the end of the rainy season a second flowering takes place, and the atmosphere being warm and dry when the fruit is ripening, it is developed as well as the nature of the climate will permit the particular sort cultivated to attain.

DELICACY OF VARIETIES IN RESPECT TO CLIMATE.

It is well known that the great number of varieties of the vine are very delicate in respect to climate; and because a particular variety is fine in one place it is not a good reason for expecting it to succeed in another. The vines which produce the highest class of wine have often been taken from their special districts to others in the hope of extending their culture with little or no success so far.

OUR VARIETIES OF GRAPE.

The varieties common in our markets are generally considered very poor ; but if they are properly grown and allowed to ripen fully on the vine there are few varieties finer. We do not get properly ripened fruit, because such does not bear carriage, unless it is packed with extra care, and it does not keep in the condition the fruit-seller thinks is right for a long time on his stall, so he neglects the high price he might obtain by selling properly ripened fruit, for the certainty of a mediocre price by selling half-ripened fruit which may be brought to market in baskets of 50 lbs. weight, while ripe fruit would need cotton packing and a separate compartment in a box for each bunch.

AGE OF THE VINE.

In temperate climates the vine attains a great age, and in exceptional circumstances also lives a long time in this country; but the irrigation that is necessary at length brings the soil into a condition in which it is unable to sustain luxuriant growth, although manure is given as before and the vines become weakly after eight or nine years. So if a steady supply is wanted it is advisable to make a fresh plantation yearly to take the place of one of the exhausted plots.

SYSTEM OF GROWING THE VINE AT HYDERABAD, SCIND.

A clever adaptation of the system of pruning the vine chiefly used in Scotland has been employed at Hyderabad, Scind, by Mr. Strachan with great success. On a plot of ground thoroughly manured and worked as described in former chapters obsolete telegraph poles 12 feet in length are erected in lines 20 feet apart; the poles are 10 feet apart in the line, and being inserted 3 feet in the ground are 9 feet in height: longitudinal battens are fitted to the poles and wires stretched transversely at a distance of three feet.

Near each wire on both sides of the vinery a vine is planted and trained along the wire until the plants from both sides meet in the centre. Each stem or rod, as it is technically called, is then permitted to throw out side-shoots, which are ultimately pruned so that the side shoots of one vine meet those of another, and consequently are about 18 inches in length; those side branches are carefully tied up, and being encouraged about 9 inches apart on the stem cover the vinery entirely with foliage, the fruit being suspended underneath as in a home vinery. The result is a grand development of fruit, easy protection by nets from many enemies, good pecuniary returns, and perhaps the most satisfactory results, as the garden is a public one. There are also numerous imitations of the system by other growers, which promise to make Scind a grape-growing country.

VARIETIES OF GRAPES CULTIVATED IN INDIA.

THE favourite varieties of grape that are grown in Europe have been introduced many times in India, but with few exceptions fail to become established; and it will be found that little progress has been made in vine culture in India since the days of Speede, who described the grapes in general cultivation nearly 50 years ago.

Why have we been at such a standstill? We have been trying to introduce good sorts from other countries, and by that means steal a march, forgetting the principle of selection for particular climates that underlies all progress in the cultivation of plants. Instead of introducing foreign varieties only, we should grow the varieties at hand to perfection, cross-breeding them by hand fertilisation, sowing the seed produced, selecting the few good varieties obtained by that process, and discarding all others. The pollen of foreign sorts may be applied to the stigma of the sorts that have been proved to thrive; and among the cross-bred plants obtained there is a probability that a few may be superior to the sorts already in cultivation in this country and at the same time suited to the climate. At present we have established in cultivation the following varieties of grapes :—

THE WHITE MASCADINE, *Safed Ungoor*,

Is the most commonly cultivated, producing abundantly middling sized bunches of small round fruit of a greenish white colour and rich sweet flavour.

THE WHITE PORTUGAL, *Cashmeree or White Tokay, Walayetee Ungoor.*

The bunches are large and loose, the berries long-shaped, hard-skinned, sweet, and but slightly acid. This grape keeps a long time after ripening, and is commonly packed in cotton in small circular wooden boxes that are sent to all parts of India.

BLACK MONUKKA, *Bæe-danae Ungoor.*

"**Ye longe sorte,**" GERRARD.

A very fine variety, resembling the *Cashmeree* in shape. The fruit is purplish red in colour, small, long egg-shaped, flesh firm, tender, seedless, very sweet; bunches, very large, long, and tapering. Unfortunately this variety has of late years been specially attacked by fungoid disease in the Deccan and in the districts where it has been famous since the time of Gerrard, one of the early British Governors of Bombay; it is now scarce.

THE BLACK HAMBURG, *Hubshee Ungoor.*

When well-grown it is of a deep bluish black with a fine bloom; large roundish ovate in shape, flesh firm, yet tender, juicy, with a pleasant rich flavour; bunches medium size, compact; but commonly the colour is a dark mahogany or deep brown.

ENEMIES OF VINE CULTURE.

THE most serious enemy of vine culture in India hitherto has been one of the many forms of vine mildew, a parasitic plant which attacks with other places the stalk of the fruit, which consequently withers up and dies, and has given the popular name to the disease "shanking." This mildew has at times attacked whole districts where vine culture had for years been successful and completely destroyed the cultivation by blighting the cultivator's hopes of a return for his labour and is always more or less prevalent in vineyards in this country. Yet in many instances it does so little harm that its presence is not observed. When a vineyard is badly attacked there is only one remedy, that is, to cut down all the vines to an inch or so off the ground, keeping wet the earth on the stump to protect it; and having laid down a large quantity of combustible rubbish, set fire to it and burn all the vines. Then re-form the vineyard from the shoots that will rapidly spring up. The fumes of bisulphide of carbon destroy the mildew completely, but its practical application is difficult, except in the case of cuttings, which in all cases, for safety, should be taken to a chemical laboratory and fumigated before being planted in a district hitherto free from vine mildew.

The fumes of burning sulphur are also effectual, but apt to injure the cuttings and may be more convenient if cuttings are plentiful. To employ this method heat an iron vessel over a fire until redhot, place in the vessel a quantity of flowers of sulphur or stick sulphur broken fine *(gunduk)*, and hold the cuttings tied in bundles in the fumes by the aid of a long stick to prevent inhalation of the sulphurous fumes. The other enemies of vine culture are red spider, rats, flying-foxes, parrots, and many birds, which must be guarded against by nets and the other contrivances mentioned under the head of "GARDEN PESTS."

OCHNACEÆ.*

A small group of trees or shrubs with watery juice and alternate simple coriaceous stipulate leaves and showy flowers having 5 to 10 deciduous petals. The only one found in gardens is

OCHNA SQUARROSA,† *Kunuk-champa, Yerra-juvee.*

A pretty shrub with oblong, ovate, finely serrate leaves falling in the cold season, and yellow fragrant flowers with deciduous petals appearing from February to April, followed by fruit, consisting of 3 to 10 distinct *drupes.* (One-seeded indehiscent fleshy fruit, for example, the mango, peach, plum, cherry, ripening in June.) This shrub thrives without special care in Bombay gardens within reach of the seabreeze, but appears to be delicate in a hot dry climate. It is propagated by seed, which it bears freely at Bombay.

BURSERACEÆ,‡ *The Frankinsence Family.*

A group of balsamic trees and shrubs of great interest as the source of bdellium and other odoriferous gums. A few are useful in the garden for fencing.

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* *Ochnaceæ,* from the genus *ochna,* the old Greek name of the wild pear.

† *Squarrosa.*

‡ *Burseraceæ,* from the genus *bursera,* after Joakim Burser, a disciple of Gaspar Bauhin.

BOSWELLIA[*] SERRATA,[†] *syn.*, *Boswellia thurifera*, *Salie*, *Lobân*, *Googoolupoo-chittoo.*

A small tree abundant on the hills of the hot dry parts of India, the source of a sweet-smelling gum resin used as incense. Large cuttings of this tree grow well if inserted about the end of the rainy season and watered.

GARUGA[‡] PINNATA,[§] *Kurak*, *Kurak ghogar*, *Kaikar.*

A tree with alternate, imparipinnate leaves, which early take on a yellow shade and fall during the cold season, and large bunches of smooth fleshy fruits of a pale green colour at a distance, resembling bunches of white grapes. While in fruit it is highly ornamental, and is a useful tree for rough stony places. Propagated by seed or large cuttings.

BALSAMODENDRON[||] MUKAL, *Googa.*

A small thorny tree bearing trifoliate leaves, of which two leaflets are very small and one from 1 to 2 inches in length and oval in shape. The outer bark peels off in thin flakes exposing the green under layer. It is interesting as the source of the gum resin, bdellium, and is found on limestone rocks in Scind and some dry hill ranges in the Deccan. This plant may be propagated from large cuttings, and its thorny habit makes it a useful fence plant.

FILICIUM DECIPIENS[**] (*Singalese, Pehimbiagaha*).

A very ornamental tree, slow of growth, with bright green fern-like leaves, having narrow leaflets and the midrib winged.

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[*] *Boswellia*, after Dr. Boswell, formerly of Edinburgh.

[†] *Serrata*, toothed like a saw.

[‡] *Garuga*, from the Telingi name.

[§] *Pinnata*, having leaves divided horizontally like a feather.

[||] *Balsamodendron*, balsam tree ; *mukal*, the vernacular name.

[¶] *Filicium*, from *filix*, a fern, from the resemblance of its leaves.

[**] *Decipiens*, deceiving.

Any good garden soil with a moderate water-supply is suitable. Propagated by seeds, which may be procurable from the Botanical Garden, Paradeniya, Ceylon.

MELIACEÆ,* *The Neem Family,*

Has many beautiful and useful trees, of which mahogany, toon, and the neem are examples. As a rule seeds in this family are short-lived and must be sown when quite fresh.

SWIETENIA† MAHOGANI,‡ *The Mahogany Tree.*

This fine timber tree is a native of Central America, but thrives well in this country on a deep alluvial soil watered while the tree is young. There are grand examples at Calcutta, where the average rainfall is 65½ inches, the mean yearly temperature 77·8° Fahr., the maximum being 103 and the minimum 52. There is also a fine specimen at Kirkee, where the rainfall is less and the temperature is lower than at Calcutta, and at Madras it thrives well. It is of upright habit with dark green foliage, consisting of alternate exstipulate pinnate leaves with entire oblique leaflets. It rarely flowers in this country, and is propagated by seed, which is procurable at times from the Superintendent of the Botanical Gardens at Calcutta.

In preparing this tree for planting road-sides it is advisable to sow the seed in deep narrow pots and plant out when a foot high, placing the pot in the hole and smashing it as the earth is being filled in. The intention of this is to preserve the top root and let it go downwards, as it is naturally inclined to go.

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* *Meliaceæ*, from the genus *melia*, the Greek name of the Ash tree.

† *Swietenia*, after Gerard von Swieten, a Dutch botanist, 1700—1772.

‡ *Mahogani*, from the vernacular name.

MELIA AZEDARACH,* *Bukan, Bakayan.*

With a fair garden soil and occasional watering needs no special attention; its flowers are lilac-coloured and sweet-scented, and its leaves are thrice divided. The latter character serves to distinguish it easily from

MELIA AZADIRACHTA,* *Margooa or Neem Tree, Nimbay, Limbro.*

A well known tree very useful on road-sides. To plant this tree prepare holes 3 feet deep, place any sweepings or manure available at the bottom, fill in the hole with surface soil, and sow a few seeds as soon as they are ripe in September and water occasionally if the weather is dry. Protect carefully with thorns during two or three years and the tree will give no further trouble.

MELIA SEMPERVIRENS, *Rohituka, Harimkhana, Satin wood tree, Bheria, Halda, Billu, Mududad, Marum.*

AMOORA ROHITUKA,

CHLOROXYLON SWIETENIA,

SOYMIDA FEBRIFUGA, *Rohun, Rohina, Soymida, Wondmarum,*

CHIKRASSIA TABULARIS, *Pabba, Dalmara, Chickrassi,* and CEDRELA TOONA, *Deodari, Kuruk tuda, Tunna, Mahanim.*

All the above are fine hardy trees growing in a variety of conditions and all thriving in deep stony soil if fresh seeds are sown and slight shade and protection given until the tree is established.

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* *Azadarach*, the Persian name.

CHAILLETIACEÆ

Is a small group of trees and shrubs with alternate, entire, stipulate leaves and small unsexual flowers, sometimes the peduncle andate to the petiole. It is of no importance in the garden, and is mentioned here only to retain the natural sequence of the orders or group of plants described.

OLACINEÆ.*

This natural order has very few attractive garden plants, but one is very curious and met with in garden fence about Dharwar and other southern districts, viz.:

OLAX SCANDENS,† *Turka vepa,*

Is a climbing shrub rising in fences by means of strong recurved spines and having smooth leaves in two lines and minute flowers.

ILICINEÆ,‡ *The Holly family.*

The most interesting member of this group to be found in Indian gardens is *Ilex paraguayensis,* § the "Maté" or Paraguay tea plant. It forms a small evergreen tree with opposite smooth serrate leaves and minute white flowers produced copiously at Dapuri during October.

The effects of an infusion of Maté leaves are described as gently stimulating and preventing a waste of tissue during fatiguing journeys and to be due to Theine, the same principle as gives value to tea and coffee.

Many proposals to cultivate this plant in India on a large scale have been made, but it is very doubtful whether it would compete with tea, as its most ardent advocate cannot claim an agreeable flavour as one of its characteristics.

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* *Olacineæ*, from the genus *olax*, Greek for a furrow, in allusion to the petals, often 4 coherent, 1 free.

† *Scandens*, climbing.

‡ *Ilicineæ*, from the genus *ilex*, the name given by Pliny to the Holly.

§ *Paraguayensis*, from Paraguay.

A few notes on the climate in which it has been proved to grow well may be of use.

The finest trees of this plant I have seen are in an old Botanical Garden at Dapuri near Poona. Those trees are of about 30 years' growth and the stems are 25 inches in circumference. The best tree of the sort is on a rich loam overlying decayed trap and has not been irrigated during the last twenty years.

There are also fine large bushes of the Paraguayan tea in the Botanical Gardens, Calcutta, and the Agri-Horticultural Gardens, Madras, therefore the range of climate in which it thrives in this country is very considerable.

The plant which resembles the British Holly very much and found within high-water mark in creeks on the western coast of India is *Acanthus*[*] *ilicifolius*,[†] but its leaves are opposite and Holly leaves are alternate.

CELASTRINEÆ,[‡] *The Spindle Tree Family.*

A group of small trees with sometimes spinescent branches and opposite or alternate leaves and small flowers. A few are useful as shrubbery plants and valuable in medicine.

CELASTRUS PANICULATUS, *Malkangani*, *Valuluvai*, *Atiparicham*, *Pigavi*,

Is a nice-looking hardy shrub plentiful in hilly districts, having lenticular warts on the branches and the leaves 2½ to 5 by 1¼ to 2½ inches, oval-oblong or ovate-serrate acuminate membranous small yellowish green flowers in terminal pendulous panicles producing a 3-celled globose capsule containing 3 to 6 seeds with a complete *arillus*—a covering on the outside of the true seed-coat arising from the stalk of the seed funicle. The seeds "are considered to be useful in rheumatism, gout, paralysis, leprosy, and other disorders," Dymock's Vegetable Materia Medica of Western India. Progated by seed in ordinary soil.

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[*] *Acanthus*, from *akanthos*, a spine.

[†] *Ilicifolius*, having leaves as in the genus *ilex*.

[‡] *Celastrineæ*, from the genus *celastrus*, from *kelas*, the latter season, applied to trees which were late in ripening their fruit.

ELÆODENDRON[*] GLAUCUM, *Booth-kase*, *Tumruj*, *Nerija.*

Is a beautiful hardy shrub with elliptic or ovate-serrate shining leathery leaves arranged oppositely generally and sometimes alternately. Its leaves when dried and powdered are used as a sternutatory and its smoke to rouse women from hysterical syncope *(Sakharam Arjun)* in Dymock's Vegetable Materia Medica of Western India. The Marathee name *Booth-kase* implies a hair of an evil spirit—a dreadful name for such a nice-looking shrub. It is propagated by seed or layers.

RHAMNEÆ,[†] *The Bor or Jujub Tree Family.*

A tribe of erect or scandent trees or shrubs with *spinose*[‡] or *aculeate*[§] branches and simple coriaceous leaves usually alternate and often 3 to 5 nerved[||] and small greenish flowers in dense axillary cymes succeeded by a capsular or drapaceous fruit.

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[*] *Elæodendron*, from *elæo*, an olive; *dendron*, a tree—the fruit resembles an olive.

[†] *Rhamneæ*, from the genus *rhamnus*, from *rhamnos*, the old Greek name.

[‡] *Spinose*, having pointed parts, which arise from the woody tissue.

[§] *Aculeate*, having prickles, pointed portions, which arise from the bark.

[||] *Nerved*—This term is applied when the ribs of the leaf diverge from the base, as in the *Bor*.

ZIZYPHUS* JUJUBA, *Bhor kool, Rengha, Bhaer.*

This thorny tree has not been cultivated as much as it deserves. Its fruit is considered by the people of India very delicious, and it is said that Mahomet included it among the joys of Paradise, that it has a peculiar perfume which requires early training to enjoy is well known, but the fact does not detract from its practical value. Like other fruit trees generally raised from seed there is great variety in the size, shape, and flavour of the fruit. The best are elliptical, two inches in length by one in thickness, and are propagated by enarching or budding on seedlings of the common sort. This fruit may be grown to perfection in districts with scanty rainfall, and is benefited by pruning away the small branches after the fruit is gathered in January or February. To raise this tree sow common seeds in any *deep* friable stony soil and when two years of age bud with the superior variety as low as practicable, so as to reduce the danger of suckers rising. Budding is performed exactly as in roses, and the month of November has proved a suitable season, but, no doubt, the bark will rise freely at any time between May and December.

If plants are wanted to send away, seeds should be sown in pots, and when of sufficient size enarched to the good variety. As the seedling takes two years to attain a fair size, this is a more tedious operation than budding.

SAPINDACEÆ,* *The Soap-nut Family,*

Are trees, shrubs, herbaceous climbers of extremely variable aspect, which will be understood from the following examples better than from a description.

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* *Zizyphus*, from zizouf, the Arabic name of the fruit.

† *Sapindaceæ*, from the genus *Sapindas*, from *Sapo indicus*, Indian soap.

CARDIOSPERMUM[*] HALICACABUM,[†] *Balloon Vine, Jyotish mutee, Noaphutki, Sibjhool, Nalla goolisienda.*

A climbing herb with wiry stems, alternate exstipulate leaves, biternate, coarsely dentate leaflets, and small white flowers producing large inflated membranous capsules, having three divisions (cells), enclosing a few seeds. When ripe, black, with a distinct heart-shaped white mark.

This very pretty plant is of such easy culture that it is apt to become a weed. A few seeds of it sown near the root of any small shrub of open, hardy character produces a pretty effect. Seed should be selected from plants having the largest capsules as great variation in size occurs.

DODONÆA[‡] VISCOSA.[§]

A stiff, wiry, virgate shrub with alternate smooth wiry leaves, widening from the stalk upwards. Is one of the best plants for edging to wide roads; for internal division in a garden or to hide objectionable objects it is very useful. It thrives in a deep sandy or stony soil. If the soil is deep, after the first season it does not require watering. Propagation is effected by seed procurable from the Lahore Public Garden and other places with a dry climate.

NEPHELUM[||] LITCHI,[¶] *The Litchi,*

Is a small tree with spreading branches and compound alternate exstipulate leaves 3 to 9 inches, having from 2 to 8 leaflets, 1½ to 6 inches by ½ to 1¾ inches, and very small white flowers, producing a globose fruit about 1 inch in diameter in seedling plants, but as large as an hen's egg in select varieties with a rough thin scale-like brittle rind of a dull brown colour when ripe and containing one or two seeds having a large fleshy whitish *aril*, which is the edible part.

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[*] *Cardiospermum*, heart-seed, from the heart-shaped mark on the seed.

[†] *Halicacabum*, the bladder work.

[‡] *Dodonea*, from Dodonæus, Physician to Maximilian 2nd.

[§] *Viscosa*, viscid.

[||] *Nephelius*, an ancient name for Burdock.

[¶] Lichi, the Chinese name.

This Chinese fruit tree thrives near Calcutta and at Bangalore. At Bombay it fruits well, but is not much grown, probably because the soil it would occupy is profitably engaged in bearing mangoes.

The fact that the tree thrives at Bombay and Calcutta indicates a love for moisture, and at Bangalore it appears indifferent to considerable altitude. No doubt the true reason is the need for an equable climate and the absence of hot winds. At Poona the only healthy trees are in a well sheltered position, and it is reported to be a very delicate tree in the North-West Provinces.

Of Litchi plants raised from seed the proportion which bears good fruit is so small that it is practically of no value. Sorts worth cultivating are propagated by grafting and layering by "gootee."

NEPHELIUM LONGANA, *Longan, Ashphul.*

A small tree of the Western Ghauts and Eastern Bengal, is useful in gardens where the climate is moist for the edible *aril*.

ANACARDIACEÆ,*

The Mango and Cashew Nut Family.

This tribe of plants is well represented by the mango, cashew nut, and marking nut.

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* *Anacardiaceæ*, from the genus *Anacardium*, from *ana*, above or without; *kardia*, the heart, with reference to the nut being on the top of the swollen peduncle.

MANGIFERA* INDICA, *the Mango, Amb, Mamadichitoo, Mangas, Marum.*

By far the greater number of mango trees in this country are seedlings, and, as usual in such conditions, the qualities of the fruit are extremely varied, some being justly considered among the most delicious fruit in the world, while the great majority have the turpentine flavour and fibre developed to a very undesirable extent.

It appears that the Portuguese first noted the great diversity of quality and applied the art of grafting to propagate the superior kinds, which have long been known as Mazagon and Goa mangoes.

The mango needs a deep and well-drained loam. The finest mango trees I have seen are growing near a river bank, and a well dug near the trees showed the following strata: 5 feet fine alluvial loam, 7 feet 'marl' (a mixture of lime and clay), and 5 feet coarse gravel, which provided perfect drainage. Such a soil is not often available, and good mango trees may be grown in any deep loam with good drainage. The mango enjoys heavy rainfall or irrigation; but appears to suffer from stagnant water more than many other trees.

In the great mango tree plantation at Khed Sivapoor, which has 5,000 trees, I examined the section of an unfinished well and found it from the surface downwards:—

Dark brown loam	5 feet.
Calcareous marl ,, ...	9 ,,
Coarse gravel ,, ...	2 ,,
Very porous, nodular trap	3 ,, and

rock in an extremely disintegrated state, resembling what one would imagine would be the effect if lava had cooled suddenly, 4 feet. Grafting the mango is described at pages 65-66.

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* *Mangifera—Mungas*, the Telingee name, and *fera*, to bring.

SELECTION AND PRICE OF MANGO GRAFTS.

From the common system of grafting by inarching, in which case the roots of the stock are confined in a pot for about two years, the grafted plants are very delicate, and heavy loss is usually met with in planting. To avoid this, select plants grafted as young as possible, plant out when small, and protect them with a basket-work guard. Good grafts of the best varieties are sold at from 8 annas to Rs. 1 at Poona.

TO PLANT MANGO TREES,

Dig holes at least 2 feet in length, breadth, and depth, and 20 feet apart. In digging the holes place the upper layer of soil on one side near the margin and the lower on another side about 3 feet distant. Place at the bottom of the hole about 50 lbs. weight of bones, then dig round the margin of the hole about 9 inches in depth and width, at the same time burying all grass and weeds. Mix some of the soil that had formed the upper layer of the hole with a basket of well-decayed manure, and place a portion of it in the pit. The tree should then be planted firmly with the surface of the old soil an inch lower than the margin of the pit, and the remainder of the soil mixed with manure placed around the tree in the form of a cone hollowed out at the apex to retain water. The soil which was taken from the bottom of the pit may then be spread on the surface, where, by the action of the air, it will become fit to afford nourishment to the tree, whereas if placed near the root in planting it would probably do injury.

If young vigorous plants which have not been long confined in pots cannot be obtained take such as are available, and when mango seeds are ripe plant 5 or 6 seeds near to the weakly graft. When the seeds have grown up enarch the strongest plant to the weakly graft that has been planted. The root of the seedling not having been injured by growing in a pot, will lend the plant sufficient help to make a vigorous tree.

Another system is to prepare the planting holes as detailed above and plant 5 or 6 mango seeds in each hole. If protected from cattle and watered occasionally, the seeds will spring up and soon make vigorous trees. When about three or four years old, the trees may be cut down to a foot from the surface and grafted by crown grafting: with the aid of the graft protector described and figured at page 65*a*; this system becomes quite practicable, and to a skilful grafter will be much more cheap than planting the grafted plants that have been reared in pots.

MANURE FOR MANGO TREES.

When the tree is young, manure is certainly desirable for the mango tree. It induces rapid development, so that the tree bears a quantity of fruit that repays attention, although the time of beginning to bear may be retarded for one or two years. In planting mango trees large quantities of bones, as fresh as are procurable, should be buried in the pits prepared for planting. If the bones are broken small the effect will be more early apparent, but unbroken bones will ultimately yield up their constituents under the dissolving action of the carbonic acid at the point of the roots. Bones alone are not sufficient manure because they are not soluble quickly when in the soil, therefore should be supplemented by old cowdung or small fish such as are at times procurable cheaply from creeks or rivers. Although the cost of dried salt-water fish was Rs. 1-6 per 80 lbs., I found its use highly satisfactory. 40 lbs. weight given to each tree in three doses at intervals of four months gave young mango trees a stimulus that lasted three years, and further special manuring I do not think desirable, the manure given to the crops grown between the trees apparently being sufficient.

I have manured large established trees as experiments, but have never seen any benefit from it.

The cultivators near Bombay apply about 10 lbs. weight of common salt to each large tree about the end of the rainy season. The effect of this will probably be to arrest the growth of leaves during October and November, and thereby encourage the formation of flower buds; and as the mango appears not to object to salt this practice in the climate of Bombay is highly commendable. It will be understood that it is only on account of the arrestment of leaf development that the salt may be useful and that in other climates the same effect may be induced by other means—for instance, cold or drought,—but in gardens where watering is necessary for other crops and the mango shows a tendency to produce fresh leaves during October and November, the application of salt will, no doubt, bring about the desired result. To be effectual it will be necessary to apply the salt during September—to arrest growth after it has set in, will not be useful.

I have lately washed mango trees with a solution of ferrous sulphate of iron, *heeracas,* in order to destroy fungoid growth, and the effect has been a distinct improvement in the appearance of the trees, which I cannot ascribe to the removal of fungus only. It is probable that some of our soils have less soluble sulphur and iron than the mango requires, and I recommend it for *careful* experiment, bearing in mind the facts that ferrous salts are generally detrimental to plants and that sulphur is considered by some investigators to be quite unnecessary in a fertile soil.

ENEMIES OF MANGO CULTURE.

Among parasites *Loranthus longifolius*, the *Bhangool, Bura munda*, and *Yellinga wadinika*, is very destructive, but is easily kept down by the axe. Insect enemies of the mango are innumerable. One of the commonest is the scaly coccos, which covers the undersides of the leaves with small yellowish scales, the bodies of the females, which suck the sap of the leaves. Cutting off and burning affected branches is the most practicable cure.

The larva of a beetle, very like the stag beetle of Europe, and having the same habits, is very destructive to particular varieties of mango by boring into the wood, and it is remarkable that Alphonso is one of the sorts the insect chiefly affects. If tar is poured into the hole the large grub will after a time come to the mouth, when it may be pulled out with a thorn and the hole plugged up with a tight-fitting cork. The presence of this grub indicates as well as causes decay and prevention by keeping the tree pruned of decaying branches and otherwise clean is better than any cure.

An insect that has not been sufficiently studied is very destructive by laying its eggs in the young growing shoots. The developed grub attains 1 inch in length before the shoot is entirely destroyed. The encouragement of insect-eating birds appears to be the most practicable means of coping with insect pests; but how this is to be attained must be left to others to indicate. I once thought that keeping down the so-called birds of prey would ensure it, but on examining the craws of such birds I found destructive grubs in abundance.

ALPHONSE OR APHOOS

Is universally admitted to be the finest of all varieties of mango. In flavour its fruit is indescribable; it seems to be a subtle blending of all agreeable flavours. In weight the fruit averages 8 oz., and in colour green, enriched by a crimson glow on the exposed side, and in shape oblong, slightly thickened at the upper end and without any prominent stigmatic point or beak.

The leaves vary much in size and shape, and with difficulty can be distinguisted from common varieties; but among the choice varieties the leaves of Alphonse may be known by the bright red midrib apparent until the leaves are nearly ripe. The branches of the inflorescence are of a rich rosy colour.

In manner of growth or "habit" this variety is rather stunted and irregular, rarely forming a graceful tree. It is also very delicate, and apt to give way before insect attacks more than other varieties; but as its fruit is valuable it should be kept free from insects and otherwise protected in proportion to the price the fruit brings.

PIRIE.

This is another first class variety as far as the flavour of its fruit is concerned; but unfortunately the fruit does not keep well when it is ripe, and fruit merchants, who know its character, give a price for it in proportion. The tree is of free-growing hardy character. The leaves are pale green with a white midrib, and the branches of the infloresence are greenish white. The fruit averages 8 oz. in weight, is of pale green colour, enriched with crimson on the exposed side, and has a prominent beak. The flavour is very delicious when the fruit is ripe.

COWASJEE PATEL

Is a mango of great size, the fruit averaging 1½ lbs. in weight and is chiefly valued as a cooking fruit. The tree is of vigorous upright-growing habit; the leaves are large with blunt points and pale midrib.

KHOONT or BANCHORE,

A celebrated old mango tree at the village of Kadoos in Poona district, bears this name. It is the property of Sirdar Rao Saheb Bulwuntrao Natu, of Poona, and has lately been much propagated. It is of extremely vigorous upright habit of growth, and bears finely flavoured fruit weighing about 10 ounces each. Undoubtedly this variety will be much sought after when it is better known.

PAKRIA.

I think myself fortunate in being able to rescue this fine variety from extinction. My attention was drawn to it by Dr. Visram Ramjee Gholey, of Poona, to whom the thanks of all fruit-lovers are due. I found the original tree suffering from litigation and other evils under which it is rapidly giving way, and by taking grafts I have secured several vigorous scions. The original tree is in a neglected garden near Heerabagh, Town Hall, Poona. The fruit averages 7 oz. when ripe, it is of a pale golden colour, completely without strings, and of a delicious flavour.

The leaves are, when young, pale bronze, and when mature large, pale green, and thin. Branches of the flower panicle are very pale green or white.

As I consider it of importance to be able to identify exactly a tree of this kind I have taken the following notes :—On the road from Poona to Kurruckwasla, near one of the gates of Heerabagh, is an irrigation canal culvert; 104 yards westward of this a path leads through a broken fence opposite to a built up gateway, and 155 yards from the curb stone in a S.S.E. direction is the original Pakria tree. It may also be approached by going 144 yards along the canal bank. At this point there is a small temple, and the Pakria tree is in line with the temple in a S.W. direction, about 50 yards distant, but on the occasion of my visit there was an impenetrable sugarcane plantation between.

The tree is distinguishable by an incision round the stem three feet from the ground, caused by some one trying to induce the tree to fruit more freely, but it is gradually disappearing. May it soon be lost to view. Such futile mutilation of an old tree is greatly to be deprecated.

PUNHALA,

Is one of the small-sized very sweet varieties that are great favourites with the people. It is an abundant bearer. I am informed by Mr. V. N. Khopkar, the Magistrate in charge of the village, that the original tree is 75 feet to the north of the temple of Shiva in Nagunath Wadi, a hamlet of Lalgaon, in Satara district, and that the tree grows on red soil.

BORSHA,

A grand old tree at a village of that name in Khandesh, has brought quite a fortune to its owners. Many times sums over Rs. 500 have been obtained for one crop of the fruit of this tree alone.

The fruit weighs 10 oz. on an average, and is ripe about 1st July. In shape it is oblong, with a distinct depression under the stigmatic point. The colour, when ripe, is a bright green with minute yellow spots and a rich crimson on the exposed side.

MULGOBA.

A variety from Chittor, in the Madras Presidency, is on an average 1 lb. in weight. The flesh is pale yellow, free from fibre, and of pale golden colour; the skin is green and golden.

FIRMADEEN.

A variety having all the characteristics of Alphonse, but ripening in July, after the true Alphonse is past its season.

KALA ALPHONSE, or *Archâce,*

A variety remarkable for the very dark green of its leaves and young bark. When the bark is a few months old it appears black. The tree is of a very vigorous upright habit of growth. The fruit has the flavour of Alphonse, but is later in ripening and not equal to that variety in size, and the stone is large in proportion to the fruit. This is a second class variety of good habit and suitable for a roadside tree.

There are, no doubt, many other varieties worth cultivating in the country, but it is to be regretted that the great majority of trees to be met with bear fruit extremely poor in quality when compared with other select varieties.

Some of the select varieties are so delicate that general grafting for roadside purposes could not be recommended, but Banchore is as vigorous as any seedling and, no doubt, other varieties of a like character will yet be found.

District Officers would do an immense deal of good if they would look up varieties bearing good fruit and at the same time of a vigorous habit of growth, and get the young roadside trees of the district they may be in charge of grafted.

The graft protector invented by the author, which is fully described at page 65*a*, brings the operation of grafting to a certainty.

BANCHORE OF DHAIREY.

The original tree of this variety is at the village of Dhairey, about 5 miles south of Poona. Its value as a fruit and the state of the country at the time is illustrated by the current story that while the last Peshwa ruled in Poona he kept a guard of Arab soldiers over the tree when in fruit to secure it for his own use. The average weight is 8 oz., in form it is oblong, without a beak, and in colour yellowish green when ripe.

The flesh is dark golden, very sweet, free from fibre, and of a piquant flavour. It is of vigorous habit and an abundant bearer.

SCHINUS MOLLE.

A South American tree familiar to visitors to Gibraltar, where it forms the chief ornament of the main guard gateway and is erroneously called the "pepper" tree by the soldiers. It has pinnate leaves and long gracefully drooping branches. During the growing season, when its leaves are turgid with sap, an amusing experiment may be made with its leaflets. If a leaflet freshly cut is dropped on the surface of water the sap rushing out in jerks propels the leaflet like a little boat.

This tree is easily raised from seed, and is of rapid growth while young. There is one of many year's growth at Hewra, in the Poona district.

ANACARDIUM OCCIDENTALE, *The Cashew-nut Tree* (Caju).

The "fruit" of this three is the thickened fleshy stalk of the true fruit, which is the cashew-nut. As a fruit the stalk is not greatly valued, as the flavour is not delicate, but it is as pleasant as the inferior kinds of mango, and if the trees which bear the best flavoured fruit only were propagated by inarching, as the mango is done, a welcome addition to the esteemed kinds of fruit might be obtained.

The tree enjoys a moist climate, and if fresh seeds are dropped springs up in garden fences in the Concan.

SPONDIAS[*] DULCIS,[†] *Valayatee amra.*

A small tree of the South Sea Islands with graceful foliage of alternate odd-pinnate leaves with crenate leaflets, and bearing about March small yellow flowers producing in September an oval fruit of an acid disagreeable flavour and having a stone with projecting spines in the centre. The skin of the fruit has the rusty russet colour of a fine pear. This tree may be a useful occupant of the shrubbery about Calcutta, where it thrives, but as a fruit tree the ground it takes up might be better employed. It is said by Firminger to be grafted on its relative, the *amra, Spondias mangifera.* I am surprised at this, because, after eating the fruit, I concluded that it was not worthy of attention.

MORINGEÆ.[‡]

This order has only a solitary plant in our gardens—the well known horse radish tree.

MORINGA PTERYGOSPERMA, *Sujna, Morunga.*[§]

A small tree with alternate twice or thrice pinnate leaves 1 to 2 feet in length; the ultimate divisions ½ to ¾ inch, opposite, membranous, and pale beneath; the petiole is slender and sheathing at the base. Small yellowish white irregular flower in spreading panicles, and long pendulous 9-ribbed fruit containing triangular seeds having wings on the angles.

The young unripe pods resemble asparagus in flavour and are a favourite ingredient in curries. The root has the pungency of horse radish, and is used in cookery for the same purposes. The delicate graceful foliage and the numerous white flowers combine to make a handsome garden tree if the branches are preserved during the gathering of the pods. It thrives in any fair soil heavily watered during a part of the year either by rainfall or irrigation and may be grown from seed or cuttings.

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[*] *Spondias*, the old Greek name used by Theophrastus for the plum which this fruit somewhat resembles.

[†] *Dulcis*, sweet.

[‡] *Moringeæ*, from genus *moringa*, from the Malabar name.

[§] *Pterogosperma*, having winged seed.

CONNARACEÆ.*

A small tribe of erect or climbing trees or shrubs represented in our gardens by

CONNARUS MONOCARPUS.

A shrub abundant on the western ghauts from Vingorla southwards, having leaves of 5 elliptic, lanceolate, obtusely acuminate leaflets 3 to 4 by 1¼ to 1¾ inches. Flower ¼ inch in length appearing at the end of the rainy season, followed by firm turgid capsules consisting of solitary carpels having a bright red colour and enclosing 1 to 2 arillate seeds.

During the cold season, when this shrub is in fruit, there are few more showy plants on the western ghauts, and its cultivation in gardens ought to become more common. It is easily propagated from seeds.

LEGUMINOSA,† *The Pea Family.*

This is a very large and important natural order, including many plants of importance for pulse, fodder, timber, medicine, gums, dyes, and many are cultivated for the beauty or fragrance of their flowers. Generally speaking, the order is easily distinguished by its pods, which resemble the pea or bean pod.

In such a large family it is difficult to point out any special characteristic, a knowledge of which is of value to the cultivator, *but the following may be useful. Many of the members* of this family are deep-rooting, and therefore suited to a climate having distinct alternations of wet and dry seasons. The plants take up lime in considerable quantity, therefore its presence in the soil is necessary, and the seed keeps good—at least one in some instances for several years.

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* *Connaraceæ*, from the genus *connarus*, from *konnarus*, the name of an unknown tree described by Athenæus.

† *Leguminosa*, from *legumen*, any kind of pulse.

PISUM[*] SATIVUM,[†] *The Garden Pea.*

The white varieties, widely cultivated in this country, may be sown any time between May and January if the rainfall is not over 40 inches. With a higher rainfall it is advisable to defer sowing till the rainy season is over.

A rich *deeply cultivated soil* that has been heavily manured for a previous crop and contains at least 5 per cent. of lime is necessary to produce a good crop.

It is very important to cultivate the soil deeply for this crop in order to induce the roots to go far down where water is steadily available. When this is done and watering steadily looked after, the much-dreaded mildew has much less effect than it has otherwise. In fact the plants are often able to withstand the mildew, completely outliving the enemy and bearing nearly as well as if mildew had not made an attack upon them.

To attain this deep culture it is in many soils desirable to use a modification of the lazy-bed system, as it is called in Ireland, which may be described as follows:—The plot selected for growing peas having been heavily manured for a previous crop, will be in good condition, a light dressing of manure is given, the soil worked thoroughly, then marked off into beds six feet in breadth separated by pathways two feet in width, the soil from the pathways should then be dug out to a depth of one foot and spread equally on the surface of the beds. This will nearly double the depth of soil in good order. If heavy rain falls it prevents flooding, and if irrigation is necessary the water may be turned into the sunken pathways. When Mr. Henry at Baroda adopted this plan, he found it practicable to grow marrow peas at that station, where that delicious vegetable had been previously unknown.

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[*] *Pisum*, from the Celtic for a pea.

[†] *Sativum*, cultivated.

In sowing the seed, one line having been sown, the second should be laid down one foot distant, the third at a distance equal to two-thirds the height the variety grows to, the fourth one foot distance, &c.; this gives the lines in pairs convenient for the insertion of a line of stakes for each pair. The distance apart for the rows will depend on the height of the variety, of which information is usually given on the packets—the medium distance is three feet.

The depth that peas should be sown is variable. In an open, very friable, sandy soil good pea seed germinates if sown six inches deep, and the Americans say that such deep sowing prevents mildew ; no doubt it does in America, but in this country it does not preclude the necessity of watering regularly and thoroughly. The roots being far down will certainly assist in saving water, provided the soil is in good order at a depth greater than 8 inches. Every garden soil should be regularly worked at least 15 inches in depth, but many a crop of peas are sown on soil that has not been disturbed to a depth more than 6 inches during the cultivator's lifetime. In such a case it will not be advisable to dig deeply at once : better results will be attained by employing the lazy-bed system detailed above.

Generally two inches in depth is sufficient to put in pea seed, and in distance apart in the line from one to two inches is favourable.

SHADE FOR THE SEED BED.

If the weather is very hot at the sowing time shade will be desirable until the plants are several inches through the soil; a few green branches inserted between the lines at sowing time is generally sufficient and an advisable precaution whether the weather is very hot or not.

A few good varieties that thrive in the country are—

TELEPHON,
CHAMPION OF ENGLAND,
BLUE PETER,
LAXTON'S SUPREME,
BISHOP'S LONG POD,
DANIEL O'ROURKE, AND
FILL-BASKET.

As a rule all these varieties give more satisfactory results during the cold than in the rainy season.

The quantity of seed required for an ordinary family supply is about 10 lbs. If the soil is not in proper order or the water deficient, a parasitic pest called mildew makes rapid progress. When first observed look to the soil, and if possible supply what is obviously wanting. This, giving the plant more vigour, may enable it to withstand the mildew. Some people apply flowers of sulphur for mildew.

IS IT MORE ADVISABLE TO COLLECT SEED OR TO GET SUPPLIES FROM OTHER COUNTRIES?

The varieties of annual or biennial plants that are grown in our gardens are generally cross-bred and improved by careful selection in districts specially adapted for producing a particular variety, and in some instances a particular cultivator will *make* a variety to such an extent that when the man who selected and reared the variety goes over to the majority the variety will gradually disappear because other people do not understand exactly the conditions that brought out the peculiar qualities that distinguished the particular sort. In such instances—and the majority of European vegetables of the finer sorts may be classed here—it is impossible to acclimatise a variety. One sort may be found to thrive well in a particular soil and climate, but, being an annual, after a few years of cultivation the sort is altered much. It may possibly be improved, but it certainly will not be the original variety. Therefore, if the special excellence found in a particular variety is desired to continue, let the seed be obtained from the same source as the original supply was obtained from, because hereditary influence in garden varieties of plants is very weak. A few generations in a different climate being sufficient to cause a decided change, which no amount of care will obviate, and the change is rarely in the direction of improvement.

THE KIDNEY OR FRENCH BEAN

Is easy to cultivate and gives good crops over the greater part of the country, excepting districts with heavy rainfall during the rainy season or much cold during the winter months. Any fair garden soil, well worked and enriched with manure, is suitable. Sow any time between the beginning of the rainy and the end of the cold season for black-seeded varieties. White-seeded kinds are more delicate, but yield well if sown between the middle of the rainy and the middle of the cold season. Put the seed in 2 inches deep and 3 inches apart in pairs of lines 1 foot apart. The distance very flat and a good stream available for irrigation, the beds may be 50 × 100 feet; if the ground is sloping, the beds must be smaller; and these also should be smaller if the irrigation water runs slowly, as a portion of a large bed would absorb the whole of a slow-running supply and prevent it from covering the whole bed within a reasonable time. Between the middle of September and the end of November sow the seed in lines one foot apart; the common native seed drill is excellent for this purpose, but if only a small quantity is required to be sown the lines may be made with a pick or similar implement or it may be sown broadcast: mix the seed with fine sifted manure to assist its regular distribution; let the drills be 1½ inches deep, and sow 10 lbs. to the acre for the Deccan and other dry parts of the country where the crop lives about three years; for the Concan and other places where the rainfall is over 60 inches yearly and sufficient to kill the crop sow 25 lbs. to the acre. It will be understood that sound yellow seed is meant; if it is mixed with dead seed the quantity must be increased proportionately. It will spring up in about 10 days, and seven weeks after sowing will be ready for the first cutting: take care that a sharp reaper is used, so as not to pull the young plants up by the roots, and afterwards cut once monthly or just before the flower appears; if permitted to flower, the stalks become hard and indigestible, and the plant is weakened. After each cutting the ground should be weeded, and after every alternate cutting, manure should be dug in. The quantity of water required for this crop depends on the quality of the soil; 70 tons per acre weekly is a fair quantity; but if the soil is perfectly drained 100 tons per acre weekly may be given with advantage; if the soil is deep alluvial with water near the surface much less irrigation will answer, as the roots will go to a depth of ten feet seeking water. Good seed is sold by Poona seedsmen at about Re. 1 per lb.

European varieties of Lucerne are of less vigorous growth, have a smaller seed, which is usually cheaper than the Khelat Lucerne.

CROTALARIA[*] JUNCEA,[†] *Sunn, Tag.*

The bark of this annual is the source of the valuable fibre called sunn: in the garden the crop is often sown for green manure. Any ground that it is intended to plant about the end of August should be sown thickly with this plant at the beginning of the rainy season, and the succulent crop dug in when the ground is wanted; this enriches the soil much, and keeps down weeds.

ACACIA[‡] EBURNEA,[§] *Marmat,*

A small tree indigenous in the Deccan, and

ACACIA FARNESIANA,[||] *Vilayati kaikar, Vilayati babul,*

An American naturalised species, are small-growing babul trees, valuable in the outskirts of the garden for the delightful perfume of their flowers. The *Marmat* does not propagate itself rapidly and its perfume is very sweet. Both are grown from seed.

ADENANTHERA[¶] PAVONINA,[**] *Koochunduna, Runjina.*

A large tree with ample, bi-pinnate leaves having 8 to 12 pinnæ leaflets 1 inch and minute flowers producing pods 6 to very flat and a good stream available for irrigation, the beds may be 50 × 100 feet; if the ground is sloping, the beds must be smaller; and these also should be smaller if the irrigation water runs slowly, as a portion of a large bed would absorb the whole of a slow-running supply and prevent it from covering the whole bed within a reasonable time. Between the middle of September and the end of November sow the seed in lines one foot apart; the common native seed drill is excellent for this purpose, but if only a small quantity is required to be sown the lines may be made with a pick or similar implement or it may be sown broadcast: mix the seed with fine sifted manure to assist its regular distribution; let the drills be 1½ inches deep, and sow 10 lbs. to the acre for the Deccan and other dry parts of the country where the crop lives about three years; for the Concan and other places where the rainfall is over 60 inches yearly and sufficient to kill the crop sow 25 lbs. to the acre. It will be understood that sound yellow seed is meant; if it is mixed with dead seed the quantity must be increased proportionately. It will spring up in about 10 days, and seven weeks after sowing will be ready for the first cutting: take care that a sharp reaper is used, so as not to pull the young plants up by the roots, and afterwards cut once monthly or just before the flower appears; if permitted to flower, the stalks become hard and indigestible, and the plant is weakened. After each cutting the ground should be weeded, and after every alternate cutting, manure should be dug in. The quantity of water required for this crop depends on the quality of the soil; 70 tons per acre weekly is a fair quantity; but if the soil is perfectly drained 100 tons per acre weekly may be given with advantage; if the soil is deep alluvial with water near the surface much less irrigation will answer, as the roots will go to a depth of ten feet seeking water. Good seed is sold by Poona seedsmen at about Re. 1 per lb.

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[*] ***Crotolaria***, from ***krotalon***, a rattle, alluding to the rattling seeds in the pods.

[†] ***Juncea***, like the sedge plant, ***juncus***.

[‡] ***Acacia***, from ***akadso***, to sharpen, in allusion to the spines many of the species bear.

[§] ***Eburnea***, like ivory, alluding to the thorns.

[||] ***Farnesiana***, probably in honour of the illustrious Italian family, Farnese.

[¶] ***Adenanthera***, alluding to the stamens bearing glands.

[**] ***Pavonina***, peacock-like.

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9 by ½ inch, early opening and displaying seed, which are generally of a bright scarlet and rarely yellow brown.

ALBIZZIA[*] LEBBEK, *Siris, Sirisha, Sirij, Sirla,*
ALBIZZIA ODORATISSIMA, *Sorissia, Bersa chichwa, Kali, Harreri,* and
ALBIZZIA PROCERA,[†] *Kinye gurbari, Kurra, Baro,*

Are often raised in gardens for roadside purposes, for which they are well suited, as it is easy to transplant any of them when of considerable size.

Kinye enjoys a more moist climate than the other species, but there is no special difficulty with any of them.

AMHERSTIA[‡] NOBILIS.[§]

This very beautiful and rare tree is a native of the banks of the Irrawady, and in India generally is found to be very delicate, either hot dry winds or much cold proving fatal to it; but, like many other trees, its delicacy is much more marked while young than when established, and now, when conservatories are so common throughout India, there is some prospect of its more extended cultivation than has previously been possible. In the southern dry parts the *Amherstia* might be planted on a bed of a rich soil in a temporary conservatory, which would last until the tree was established a few years, then being gradually removed would leave the tree exposed. In the Botanical Gardens at Calcutta some fine specimens are to be seen, and Mr. Scott, the late Curator, told Firminger that layering during the hot season and planting out during the rains, with abundant watering during the hot season and a rich soil were the chief points to be attended to in its culture.

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[*] *Albizzia*, named after an Italian.

[†] *Procera*, tall.

[‡] *Odoratissima*, very odorous.

[§] *Amherstia*, commemorative of Countess Amherst, a promoter of botany.

[||] *Nobilis*, noble.

The tree has large leaves of 6 to 7 pairs of lanceolate, pointed leaflets seven inches in length; when young, pendulous, closely overlapping, and of a rich ruby tint. The flowers are described by Firminger as immense pendulous candelabrum-like clusters of red and yellow flowers drooping from all parts of the tree among the handsome foliage present an appearance of astonishing elegance and loveliness.

BAUHINIA[*] VARIEGATA[†] and its white variety B. CANDIDA,[‡] *Kunchin, Kuchnar, Karal, Kuvidara,*

Are small trees suited for loose stony soil, giving very beautiful flowers—the former of several shades of rose, the latter pure white and from 3 to 4 inches in diameter. The flowers begin to appear before Christmas under cultivation in southern districts, but are reported later in the north. The pod is ½ to 1 foot in length by ¾ to 1 inch broad, decurved, and when unripe green, richly variegated with brown shades. The trees begin to bloom in the third year if well grown. By adopting the arrangement detailed for planting the tamarind, but giving a little water during dry weather the first year, this tree can be established with very little trouble.

BAUHINIA TOMENTOSA.[§]

An upright-growing shrub with ash-coloured smooth bark, bi-lobed leaves, and yellow flowers 3 to 4 inches in diameter, in axillary pairs and flat tomentose pods 4 to 5 inches in length and ½ an inch in breadth. Propagated by seed. This charming shrub is much scarcer in gardens than it should be.

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[*] *Bauhinia*, in honour of John and Caspar Bauhin, botanists of the 16th century.

[†] *Veriegata*, having different colours.

[‡] *Candida*, white.

[§] *Tomentosa*, having short soft hairs.

BROWNEA[*] GRANDICEPS[†]

Is a close relation of the *Amherstia*, and runs it hard in elegance and beauty, while being more hardy, its culture is comparatively easy. In the Botanical Gardens at Calcutta large numbers of fine specimens of this and other species conspicuous as large shrubs or small trees with pinnate leaves of about 12 pairs of pinnæ about 6 by 1 inch lanceolate long-pointed, while young pendulous and overlapping, as in the *Amherstia,* but brightly marked by shades of brown on a paler ground, or during the hot season by a great spike of glowing crimson flowers. This tree is a native of Caraccas, and thrives in a moist equable climate, such as Calcutta and Madras, in a rich soil with irrigation during the hot season. It ripens seed freely in the Botanical Gardens at Calcutta, and many seedlings cross-bred between the different varieties are being reared in the Gardens. It may also be propagated by layering.

BUTEA[‡] FRONDOSA,[§] *Palas, Palasa, Maduga.*

This well known tree requires little, if any, special care. It is propagated by seed, and in fair circumstances attains flowering size in about 10 years.

CASSIA[‖] FISTULA, *Bawa, Amaltas, Soondali, Suvarna, Jaggarwah, Warga, Gurmala.*

This very beautiful and useful tree has names in almost all the vernaculars of India, and is called the Indian *Laburnum* by Europeans. It is conspicuous by its bright golden flowers in long pendulous racemes and long cylindrical pendulous fruit, black when ripe and containing a useful laxative medicine in the pulp between the seeds.

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[*] *Brownea,* after Patrick Browne, M.D., author of a History of Jamaica.

[†] *Grandiceps,* large-headed.

[‡] *Butea,* commemorative of John, Earl of Bute, once a munificent patron of botany.

[§] *Frondosa,* leafy.

[‖] *Cassia,* from the Greek *kasia,* of Dioscorides.

The *Amaltas* is not as common as it might be, as it thrives in a great variety of conditions of soil and climate. No doubt its shy germination, delicacy while young, and difficulty in transplanting are the causes of its scarcity. To grow it prepare deep holes filled with loose soil and sow at the beginning of the rainy season seed that has been prepared for germination by keeping in an earthen pot buried in a moist dung pit for some months.

CASSIA SIAMEA,[*] *Cassia Sumatrana, Roxb., Cassid,*

Is often raised as a roadside tree, but has little to recommend it beyond rapidity of growth and hardiness. It is easy of propagation by seed.

CASSIA MARGINATA.[†]

A tree with dull light brown bark and a spreading head of branches bearing alternate-pinnate bifarious leaves of 10 to 20 pairs of linear oblong leaflets 1 inch in length and half as broad, having the margins coloured and often thickened, and bearing during the rainy season axillary, solitary, racemes of flowers ½ inch in width, in colour pink marked with greenish veins. The fruit is described by Roxburgh as cylindic, 8 to 12 inches long, as thick as a man's little finger, of a dark brown colour and having transverse partitions. This is a slow-growing and rare tree. A solitary specimen in the Bund Garden at Poona has long attracted great admiration. It appears to thrive well in that garden on a site that has been filled in. Propagation is effected by seed—layering would, no doubt, be effectual, but the graceful habit of the tree would not be retained if that method of propagation was used.

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[*] *Siamea*, from Siam.

[†] *Marginata*, referring to the coloured margin of the leaves.

CASTANOSPERMUM* AUSTRALE.†

An Australian tree found in nearly all public gardens in India. It is of very upright habit, with pinnate leaves of about 9 entire leaflets and bearing rarely saffron-coloured flowers, producing a pod enclosing large seeds somewhat resembling chestnuts. It is propagated by imported seed.

CERATONIA‡ SILIQUA,§ *Meccanee Amli.*

This small tree from Syria and adjacent countries, which bears the fruit known as St. John's Bread, was introduced many years ago, and is found to thrive well in gardens in dry districts if irrigated until fully established. Its flowers are without petals and polygamous, that is, some flowers have male organs only; others have female organs only, and a third section have both organs. In this tree the different forms of flowers are found on separate trees, and when raised from seed a large proportion prove to be male and the proportion of hermaphrodite trees among seedlings must be very small. In my own plantations only one has been found. This tree bears fruit regularly, and has been propagated by grafting. The value of the fruit hitherto has not been equal to that of a mango tree, which would occupy the same soil.

DALBERGIA|| SISSOO,¶ *Shisam Sissoo.*

A valuable timber tree useful for roadside planting because it may be safely transplanted when of large size and is of rapid

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* *Castanospermum*, chestnut-seeded.

† *Australe*, from Australia.

‡ *Ceratonia*, from *keration*, a bow, in allusion to the shape of the pods.

§ *Siliqua*, having pods.

|| *Dalbergia*, after Nicholas Dalberg, a Swedish botanist, 1730—1820.

¶ *Sissoo*, the vernacular name.

growth. It may be propagated from seed or from the very numerous shoots that spring up when a tree has been cut down.

DICHROSTYCHOS* CINEREA.†

A shrub with leaves in form resembling those of the *babul* tree, but of an ashy gray colour and bearing abundant pendulous flower spikes, of which the upper part is pink and the lower yellow, caused by the change in colour as the flowers increase in age. It is a native of the Deccan and flowers in June. Propagation by seed.

ERYTHRINA‡ INDICA,§ *Parceli.*

This yellow variegated variety of the common *Pangara* is very showy while young, and being easily propagated by cuttings is likely to become popular. Variegated plants are never as vigorous as their green typical forms, because the white part does not possess, the colouring matter, chlorophyll, which apparently is the active agent in assimilation, or the converting of the food taken up by the plant into material to increase its tissue; therefore this variety must not be expected to thrive with as little care as its indigenous type.

ERYTHRINA CRISTA-GALLI ||

This South American species of *Pangara* forms a shrub or small tree of irregular habit bearing flowers of a deeper crimson and larger than the indigenous species. It thrives in any fair garden soil in the dry districts and is easily propagated by cuttings.

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* *Dichrostychos*, having two-coloured spikes.

† *Cinerea*, gray.

‡ *Erythrina*, from *erythros*, red.

§ *Indica*, from India.

|| *Crista galli*, cock's-comb.

CLITOREA[*] TERNATEA,[†] *Uparajita, Neela dintana, Gokran, Gokrana mal.*

This very beautiful climber with large blue or white flowers, is of easy culture from seeds in any fair garden soil. Its root and powdered seed act as a purgative.

CLIANTHUS[‡] DAMPIERI,[§] *The Australian Glory Pea.*

This very delicate plant, when out of its natural habitat, the dry Australian deserts, is difficult to cultivate on account of its repugnance to moisture, but Mr. Ridley has exhibited fine specimens at Lucknow. It may be grown by preparing rich rough loam and potsherds broken, in small equal parts. A large sized pot should have the drainage carefully arranged and filled with the compost, leaving a raised mound in the centre. Stand the pot full of soil in water until thoroughly soaked. Then, having permitted the surperfluous water to run off, sow a few seeds on the mound in the centre, keeping in a sunny place. The sowing time should be after the rainy season is entirely over—about December or January will generally be suitable. In watering see that the base of the stem is not touched and that a thorough soaking is given when the soil is dry, and then withheld until the soil is dry again.

CROTOLARIA MADURENSIS,[||]

From the Nilghiris and Madura Hill, is a copiously-branched undershrub, attaining 4 feet in height with shot-petioled entire exstipulate leaves 2 to 4 inches in length and about half as broad, and panicles of bright yellow flowers in gardens 1 inch in width produced in great profusion at the beginning of January and succeeded by inflated smooth short-stalked pods containing 10 to 12 seeds. It thrives in any fair garden soil and is propagated by seed.

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[*] *Clitorea*, from a fancied resemblance to the *clitoris*.

[†] *Ternatea*, given under the impression that the plant had three leaflets.

[‡] *Clianthus*, from *kleios*, glory, and *anthos*, a flower.

[§] *Dampieri*, after the celebrated navigator.

[||] *Madurensis*, from the district of Madura, in Southern India.

HÆMATOXYLON* CAMPECHIANUM,† *The Logwood Tree.*

This very pretty tree thrives well in Deccan gardens and makes an efficient fence in good soil with irrigation while the trees are young. Its flowers are bright yellow, perfumed, and are produced in great profusion during October from trees two years of age and upwards.

LEUCÆNA GLAUCA,

An introduced tree, is one of the commonest small trees in Indian gardens: it is entirely thornless, has graceful much-divided leaves like those of the *babul*, but greatly larger; heads of white flowers twice as large as those of the *babul*, and brown smooth pods 5 to 6 inches in length by ½ an inch in width; 15 to 20 seeded, and soon opening, which hang on the tree a long time, giving it the typical seedy appearance during many months. Bees appear fond of its flowers.

LONCHOCARPUS‡ BARTERI.§

A fine woody climber of tropical Africa, resembling *Wisteria chinensis*. It grows freely with ordinary garden treatment at Poona and flowers freely after it has attained a considerable age.

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[*] *Hæmatoxylon*, blood-coloured wood.

[†] *Campechianum*, from Campeachy.

[‡] *Lonchocarpus*, referring to the lance-shaped fruit.

[§] *Barteri*, Barter's.

LATHYRUS[*] ODORATUS,[†] *Sweet Pea,*

A favourite annual in Britain, is very shy in flowering over the greater part of India, but at Nagpore and Chinsurah it flowers freely if sown at the end of the rainy season.

MUNDALEA SUBEROSA,[‡] *Sooptee.*

A stout shrub with corky bark densely silky on the branches, rachises, pedicels, and beneath the leaves. The leaves of 6 to 10 pairs of oblong lanceolate leathery leaflets 1½ to 2 inches in length and lilac or rosy flowers in close terminal pendulous racemes succeeded by a long silky pod contracted between the seeds, containing 6 to 8 kidney-shaped seeds, which are used to poison fish. A very pretty shrub, a native of the western ghauts, and thriving with ordinary garden treatment.

PARKIA[§] BIGLANDULOSA.[‖]

This tree, from the Malay peninsula, is common in our gardens; it has no vernacular name, but is easily distinguished by its white bark, feathery foliage of twice pinnate leaves having 40 to 60 pinnæ 3 to 4 inches in length, pumules ¼ by $\frac{1}{48}$ in 150 to 200 to each pinna, two glands on the petiole, and the flowers in balls 1½ inch in diameter, pendulous from a long stalk. This tree thrives in any garden soil if watered while young and is propagated from seed.

POINCIANA[¶] REGIA,[**] *Gool Mohr.*

This very showy tree is of the easiest possible culture and may be transplanted while of very large size. To prepare e seed for germination place it in an earthen pot and bury in a moist dung pit about four months before the monsoon ; expected. It is said this tree is of easy propagation by uttings in Sind.

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[*] *Lathyrus*, from *lathuros*, the old Greek name of the pea.

[†] *Odoratus*, sweet-scented.

[‡] *Suberosa*, corky barked.

[§] *Parkia*, in honour of Mungo Park, the African traveller.

[‖] *Biglandulosa*, referring to two small glands on the petiole.

[¶] *Poinciana*, in honour of M. de Poinci, Governor of the Antilles in the middle of the seventeenth century.

[**] *Regia*, royal.

SARACA[*] INDICA,[†] *Jonesia asoka*, *Asokh*, *Usok*.

This very graceful small tree thrives equally well on the western ghauts and in the Botanical Gardens near Calcutta without any special irrigation and in gardens at Poona under regular irrigation. It evidently enjoys a moist climate, and being delicate while in a young stage is not very common. It is propagated by seed, which is large, and has a very thin skin, which, no doubt, accounts for the rapid loss of germinating power, which commonly occurs to it.

SESBANIA[‡] GRANDIFLORA,[§] *syn.*, AGATI GRANDIFLORA,

Augusta, *Baka*, *Agati*, *Yerra avesi*, and *Basna* are given to the red variety. *Tella avesi* and *Sada basni* are applied to the white varieties.

A small tree of very rapid growth with large flowers and short life. It thrives in any irrigated soil. The flowers and young pods are a favourite vegetable. The flowers are a grand subject for beginners in botanical studies. Propagate by seeds.

SCHOTIA[||] BRACHYPHYLLA.[¶]

A pretty flowering shrub lately introduced from Natal, having alternate abruptly pinnate leaves of 2 to 3 pairs of opposite leaflets. It is thriving well at Poona under ordinary garden treatment. The flowers of this genus are crimson pink, and flesh-coloured.

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[*] *Saraca*, said to be from a vernacular name.

[†] *Indica*, from India.

[‡] *Sesbania* from *Sesban*, the Arabic name of Sesbania Ægyptica, *skeweri*.

[§] *Grandiflora*, large-flowered.

[||] *Schotia*, in honour of Richard van der Schot, a friend of Jacquin.

[¶] *Brachyphylla*, thick-leaved.

TAMARINDUS* INDICA,† *The Tamarind Tree, Amli, Chinch.*

This tree delights in a deep alluvial soil, and in such a position forms one of the most handsome landscape trees in this country ; but it will also grow on decayed trap soils where few trees will thrive without free watering.

For planting get a hole at least 3 feet deep and 3 feet wide prepared, fill to 6 inches above the surface with good soil mixed with some old manure. Let the surface be raised at the sides, so as to prevent water running off, and sow a few seeds at the beginning of the rains, then protect them with some thorny branches, which should be afterwards removed, the surface stirred, and the thorny branches replaced once in three months.

TEPHROSIA‡ CANDIDA.§

" A low shrub from the tropical Himalaya with slender woody-groved branches clothed with brown or grey persistent velvety pubescence," leaves short petioled attaining 6 to 9 inches in length, leaflets 19 to 25 ligulate acute, 1½ to 2 inches in length smooth above, silky beneath, and copious racemes of pure white flowers 1 inch in width, produced at the end of the rainy season—a very pretty shrub, thriving with ordinary treatment at Poona. Propagated by seed.

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* *Tamarindus*, from *tamr*, Arabic for a ripe date.

† *Indica*, India.

‡ *Tephrosia*, from *tephros*, ash-coloured, referring to the colour of the leaves.

§ *Candida*, white, the colour of the flowers.

WISTARIA* CHINENSIS.

A grand climbing shrub from China, plentiful in English gardens, and found to thrive in Tirhoot and other northern districts. Its leaf has 6 to 8 pairs of ovate acuminate silky leaflets and dense pendulous racemes of pea-like flowers of varying shades of lilac and having the wings auricled. This grand climber would thrive at most of our hill stations. It is propagated by crown-grafting on to roots.

ROSACEÆ,† *The Rose Family,*

Is a very important natural order, rich in luscious fruit and beautiful and fragrant flowers. As types of the family from which others may be recognized we may take the rose, apple, peach, strawberry. The members of this family are chiefly natives of temperate countries, but we cultivate many in our gardens. Cuttings or layers are the chief means of propagation and selected varieties are often grafted (by budding) on to common sorts. Many seeds in this family are irregular in germinating, and are improved by being buried in a pit about 2 feet deep for one year.

THE ROSE.

Throughout the dry parts of India roses can be grown with very fair success, but on the sea-board, where the rainfall is heavy, some extra care is required to prevent water lodging about the roots during the rainy season; and the moist condition of the atmosphere keeps the plants growing on without rest, and in consequence they are comparatively short-lived.

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* *Wistaria*, in honour of Caspar Wistar, 1761-1818, Professor of Anatomy in the University of Pennsylvania.

† *Rosaceæ*, from the genus *Rosa*, Latin for rose.

Soil.—A deep well-drained soil of a firm nature, such as the black soil of the Deccan, is well suited for roses. It should be enriched by a liberal supply of well-rotted bullock dung or leaf mould.

Propagation.—Many varieties of roses strike freely from cuttings, and plants raised by that means are to be preferred for pot culture. The cuttings should be about four inches long, of well ripened wood, cut at the lower end close to an eye, and inserted about half their length in a pot or box containing a very sandy soil. Keep in a shady place and water slightly every alternate day. If well-ripened wood can be procured, the season is not of much consequence, but generally speaking the cold season is the most favourable.

In the Deccan and other dry parts of India, where the common pink rose thrives freely, it is advisable to have roses budded on this stock, as it induces a vigorous habit of growth, and the plants can be grown as standards without the use of stakes. Budding may be performed at any season while the stock is growing vigorously. (For particular instructions in budding, see pages 63 and 64.)

Pruning the rose requires considerable knowledge of the various classes and often of the habit of particular varieties. In all kinds weakly or malformed shoots, or such as are decayed at the points, should be cut out from their origin and crowded branches thinned. In the Noisette class, which includes the yellow roses Lamarque and Solfaterre and Marechal Neil, that are so common in this country, the weakly shoots should be cut out and the strong ones reduced by about a third of their length. The proper season for this operation is when the tree is at rest during April. As this class of rose flowers from short side-shoots as well as at the ends of the branches the ends of long rampant branches may be pinched off during the growing season with advantage.

The hybrid perpetual class of roses, which includes many of the rich dark colours, is benefited by severe pruning during the season of rest in April or May. At this season all the shoots of the past season should be cut in till within about four buds from their origin. As these roses mostly flower at ends of strong shoots, these should be left intact until they have flowered, then a few of them should be cut back as before; this prolongs the flowering season, but if too many are cut back, it will weaken the tree.

Tea-scented Roses are so varied in their habit that almost every variety requires different treatment, yet it will serve our purpose to divide them into two classes—the strong-growing, such as Marechal Neil and Gloire de Dijon, which should be treated as before detailed for Noisette roses, and the moderate-growing, such as Reine de Portugal, should have the shoots that have flowered cut back to within four buds of their base, and all weakly branches cut out from time to time during the growing season.

China Roses should have the branches that have flowered cut back several times during the growing season.

Bourbon Roses.—This class, which includes Souvenir de la Malmaison and several other general favourites, requires little pruning beyond taking off the ends of shoots that have flowered and cutting out such as are weakly.

Roses are often grown in pots and tubs placed on garden paths and the result is deplorable. The extremes of drought and moisture that succeed each other at short intervals are very prejudicial, and the constant watering that is required is a waste of labour. If it is necessary to keep roses in pots, they should be sunk into the ground till the rim of the pot is a little below the surface; by lifting the pot occasionally, the roots will be prevented from making their way into the surrounding earth.

HOW TO ENHANCE THE PERFUME OF ROSES.

Mr. Graham of Pertabgarh in his book on "The Culture of Exotic Roses in India" tells us very distinctly how to attain this desirable object. He says *the scent of roses is due to the presence of sulphur.* It would have been more satisfactory if Mr. Graham had given the data on which that remarkable statement is founded; but, as his book shows, he knows much about roses, no doubt; this is a contribution to our knowledge of the queen of flowers. He also tells us how to prepare sulphate of lime, of which an ounce should be dissolved in a gallon of water and a pint of the solution given every other day. It is not likely to do any harm to the rose trees, and if it proves successful in the hands of other experimenters a distinct advance in rose culture will have been effected. It is not necessary to give the method of preparing sulphate of lime advised, because, although it might enlighten chemists, that article is easily procurable wherever soda-water is prepared.

FIFTY ROSES OF FREE FLOWERING HARDY CHARACTER.

The initials T, HP, &c., indicate the class as described above.

T.	Abricote	Fawn, apricote centre.
HP.	Alfred Colomb	Bright carmine red.
HP.	Annie Laxton	Fresh rose, tinted orange.
HP.	Antoine Ducher	Dark purplish rose; large and fine.
C.	Archduke Charles	Shaded rose, changing to crimson.

T.	Archiméde	Rosy fawn, dark centre.
B.	Armosa	Pink, a small rose, very free.
HC.	Brenus	Deep carmine, large, full.
HP.	Beauty of Waltham	Bright rosy crimson.
HP.	Boule de Niége	White, good form in bunches.
HP.	Charles Turner	Brilliant red, large.
HP.	Captain Christy	Very pale, flesh colour.
HP.	Caroline de Sansal	Clear flesh colour, edges blush.
N.	Céline Forestier	Citron yellow.
HP.	Centifolia rosea	Bright rose, very large.
N.	Cloth of Gold	Yellow, large double.
T.	Devoniensis	White, yellow tinted, very fine.
T.	Duchess of Edinburgh	Crimson, free flowering with good hardy foliage.
HP.	Ferdinand de Lesseps	Rich crimson.
HP.	General Jacquiminot	Brilliant red, velvety.
HP.	Géants des patailes	Rich velvety crimson.
HP.	Gloire de Santeney	Rich crimson.
T.	Gloire de Dijon	Yellow, shaded salmon or buff, very fine.
T.	Goubalt	Bright rose, centre buff.
T.	Isabella Sprunt	Deep canary colour.
HP.	Jean Goujan	Deep carmine rose.
HP.	John Hopper	Beautiful carmine.
HP.	La Duchesse de Morny	Clear light rose.
	La France	Pale peach, rose centre, very large.
N.	Lanai	Beautiful rose, large cup-shaped.

N.	Lamarque	White shaded, sulphur yellow at centre.
T.	Le Pactole	Cream yellow, shaded blush.
HP.	Lord Macaulay	Rich velvety crimson.
HR.	Lord Raglan	Rich carmine, tinted with violet.
T.	Louise de Savoie	Fine yellow, large and full.
HP.	Mad. Alfred de Rougemont.	White shaded rose.
	Mad. Boll	Deep rose, large and full.
T.	Mad. de St. Josephs	Salmon pink.
T.	Mad. de Tartus	Delicate pink, large.
T.	Mad. Camile	Pink, veined with white.
T.	Mad. Falcot	Orange and yellow, large.
HP.	Mad. Halphen	White, salmon pink, centre yellowish.
T.	Mad. Margotine	Deep citron yellow, centre rosy peach.
T.	Mad. Villermoz	White, centre salmon.
HP.	Mrs. Charles Wood	Bright red, large, full.
HP.	Mrs. Veitch	Bright rose, large, deep petals.
T.	Marechal Niel	Bright golden yellow.
T.	Niphetos	Very pale lemon.
T.	Perfection de Montplaisir.	Canary yellow, very fine.
T.	Reine de Portugal	Deep golden yellow, centre salmon.
T.	Solitaire	Very pale rose, shaded white.
N.	Solfaterre	Sulphur yellow, large, double.
T.	Souvenir d'un Ami	Salmon and rose.
T.	Vicomtesse de Cazes	Yellow, centre tinted copper.
HP.	Victor Verdier	Rose with shaded carmine.

The following is the price list of a Calcutta Nurseryman:—

For the information of readers in England it may be noted that at the present rate of exchange the *rupee* is worth 16 pence in England, the *anna* is $\frac{1}{16}$th of a rupee, and the *pie* $\frac{1}{12}$th of an anna.

The following abbreviations have been used :—

VIG.—For vigorous, that is, varieties which producel ong vigorous shoots, most of them adapted for Pillar Roses.

FREE.—Varieties which are free-growers making large heads.

MOD.—For moderate ; varieties forming medium compact heads.

ROB.—For robust-varieties which form very stout shoots of less length than "vigorous."

T.—For Tea Rose.

N.—Noisette.

B.—Bourbon.

	NAMES.	HABITS.	DESCRIPTIONS.	Rs.	A.	P.
1	Abel Carriere	...Free.	Purplish crimson, fiery red centre ; fine flower ...	0	8	0
2	Abel Grand	..Vig.	Beautiful silvery rose, glossy and clear in colour ...	1	0	0
3	Adolphe Brogniart ...	...	Flowers bright carmine ...	0	8	0
4	Achille Gonod ...	...Vig.	Bright carmine, very large, full, good form	1	0	0
5	A. K. Williams ...	...Free.	Bright crimson, petals beautifully arranged	1	0	0
6	Alba Mutablis ...	.. Free.	White, slightly tinted with pink ; a large and full flower	1	0	0
7	Albert Paye	...Vig.	Flowers large and very well formed ; beautiful delicate flesh pink	1	0	0
8	Alexis Pere	..Free.	Bright clear pink, good shape, large full flower	1	0	0
9	Alfred Colomb ...	..Mod.	Bright fiery red ; one of the finest roses in cultivation...	0	8	0
10	Alfred Dumesnil ...	...Free.	Beautiful pinkish carmine, shaded with violet, large, full, and of a good cupped form	1	8	0

Names.	Habits.	Descriptions.	Rs.	A.	P.
11 Aline Sisley, T.	Mod.	Varying from deep purple rose to shaded violet red	1	0	0
12 Andre Dunand		Pink, with silvery white edges, large full and of fine form	1	8	0
13 Anna Alexieff	Free.	Bright pink, not large; a lovely colour	0	8	0
14 Antoine Ducher	Free.	Vivid red, very large, fine form, good rose	0	8	0
15 Antoine Mouton	Free	Fine rosy pink, very large and full	0	8	0
16 Aristide Dupuis		Flamed with scarlet	0	4	0
17 Avocat Duvivier	Free.	Very effective, bright purplish red, very large, full, perfect form	0	8	0
18 Baron de Bonstetten	Vig.	Flowers very large, beautiful rich velvety crimson; a fine rose	0	8	0
19 Baronne Pelletan-de-Kinkillen		Vivid crimson	0	4	0
20 BARON NATHANIEL DE ROTHSCHILD		Bright crimson, without shading, large full, and of exquisite shape; foliage deep green and very vigorous	2	8	0
21 Baroness Rothschild	Rob.	Beautiful pale rose, shaded with white, very large and double, good habit, one of the best	1	8	0
22 Bernard Palissy		Brilliant carmine	0	8	0
23 Beauty of Waltham	Free.	Light crimson, large, full fine rose	0	8	0
24 Belle-de-Bourg-la-Reine		Bright pink	0	8	0
25 Black Prince	Free.	Velvety crimson, large and full, foliage a beautiful dark green	0	8	0
26 Belle Lyonnaise, T.		Canary yellow, changing to white and of fine form	0	12	0
27 Beauty of Stapleford			1	0	0
28 Belle-de-Marguerite, T.		Yellowish-red	0	4	0
29 Bessie Johnson		Light blush	0	8	0
30 Bouquet-des-flores, B.		Brilliant rose	0	4	0

	NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
31	Brightness of Cheshunt (1882)	Vig.	Peculiarly vivid brick red; a medium size flower, of open imbricated form. A hardy garden rose	2	8	0
32	Captain Christy	Vig.	Delicate flesh colour, deeper shade in the centre, a very effective colour; very large	0	8	0
33	Climbing Captain Christy	Vig.	Similar to *Captain Christy*, but of a very vigorous climbing habit	1	0	0
34	Cardinal Patrizzi	Mod.	Deep carmine with pale edges; large and full	0	8	0
35	Captain Lamure	Free.	Deep red, changing to violet; large and full	2	8	0
36	Charles Lefebvre	Free.	Fine brilliant velvety crimson, large cupped: one of the finest roses in cultivation	0	8	0
37	Cloth of Gold, N.		Golden yellow, large and good	0	4	0
38	Comte de Nantueill	Free.	Deep rosy pink, fine cup shape; good showy rose with all properties	0	8	0
39	Comtesse de Comando (1881)	Vig.	Beautiful bright red, shaded with carmine and tinged with vermilion; very large and full	2	8	0
40	COMTESSE DE CASTEJA		Rich deep scarlet; large and of perfect imbricated form; opens freely; growth vigorous; seedling from *Alfred Colomb*, quite as good in shape, but of a different colour	2	8	0
41	Comtesse de Jancourt		Rosy flesh	0	8	0
42	COMTESSE DE MAILLY-NESLE		Beautiful flesh pink, tinted white; large, full, and well formed; foliage a pale shiny green; vigorous and very free flowering	3	0	0
43	Comtesse de Sereyne	Free.	Light pink shaded with rose, very large; form of *Centifolia*	0	8	0
44	Comtesse d'Oxford	Vig.	Bright carmine red, large and full, fine form; a splendid showy rose	1	0	0

	Names.	Habits.	Descriptions.	Rs.	a.	p.
45	Coquette-des-Blanches	...	Pure white, medium size, full, good form, and very free flowering; one of the best perpetual whites	0	4	0
46	Countess of Roseberry	...	Brilliant carmine rose, large and full, of finely cupped form, a vigorous growing variety	2	0	0
47	Crowm Prince ...	...Vig.	Bright purple, lurid crimson in the centre; a free flowering garden rose	1	0	0
48	Denil de Prince Albert	...	Rich dark velvety crimson; a superb rose...	0	12	0
49	Dean of Windsor ...	...Free.	Rich vermilion, sometimes shaded crimson, large, full, of good form; a constant bloomer	1	0	0
50	Devoniensis, T. ...	...Mod.	Creamy white, large and beautiful	0	4	0
51	Docteur Baillon ...	...Free.	Bright reddish carmine, shaded purple, fine form, large and full	0	8	0
52	Duc de Montpensier...	...Free.	Deep velvety crimson tinged with fiery red; fine large flower, very full	1	0	0
53	Duchesse de Vallombrosa	..Free.	Most beautiful satiny pink, passing to white imbricated; growth very vigorous; a fine rose	1	0	0
54	DUCHESS OF CONNAUGHT.		Most brilliant crimson, shaded with dark velvety purple, and frequently with a blue metallic lustre impossible to describe. It is of a full globular form, the shape faultless; very sweet-scented, a good grower and very free bloomer	0	8	0
55	DUKE OF ALBANY	...	Vivid crimson when first opening, changing darker as the flower expands, and developing a beautiful shading of velvety black; growth vigorous	1	8	0
56	Duke of Connaught ...	...Vig.	Fine dark velvety crimson, very fine	0	8	0

NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
57 Duke of Edinburgh . .	...Vig.	Fine Vermilion; large, full, and good shaped	0	8	0
58 Duke of Teck, 1881 ...	...Vig.	Bright crimson scarlet, clear and distinct, and of good pointed globular form ...	2	0	0
59 Duke of Cambridge ...	. Mod.	Deep red of medium size ...	0	4	0
60 Depuy Jamain ...	...Vig.	Very bright cerise; large, full, and fine form; blooms freely	0	8	0
61 EARL OF PEMBROKE ...		A vigorous grower of the form of *Marquise de Castellane*, but not quite so thorny; colour soft velvety crimson, enlivened on the margin of the petals with bright red; quite distinct and useful for all purposes; a seedling from *Marquise de Castellane* by *Fredinand de Lesseps*	3	0	0
62 Empereur de Maroc...	...Mod.	Rich velvety maroon; a most distinct variety	0	8	0
63 Emilie Hausburgh ...	...Mod.	Soft rose, edged white, fine form, first-rate showy flower	0	8	0
64 Empress of India ...	...	Dark brownish crimson, a distinct and good variety ...	1	0	0
65 Etienne Levet ...	...Free.	Nearly thornless, free flowering fine carmine red ...	1	0	0
66 Etendard de Jeanne d' Arc	..Vig.	Creamy white, changing to pure white, very large and full	1	8	0
67 Evique de-Nesmes ...	...	Bright purplish red	0	4	0
68 Exposition de brie ..	...Free.	Bright crimson, large, full, and fine form; one of the best	0	8	0
69 Fanny Petzold ...	...	Brilliant red; large and full...	0	4	0
70 Geant-des-Batailles ...	..	Brilliant crimson, large and double	0	4	0
71 Francois Lacharme...	...	Bright carmine, changing to red; full, globular; a superb rose	0	8	0
72 Général Douai ...	...Free.	Fine upright grower, very bright rose colour; grand flower	2	8	0
73 Général Jacqueminot	...Vig.	Brilliant scarlet crimson; large and magnificent	0	8	0

Names.	Habits.	Descriptions.	Rs.	A.	P.
74 George Moreau (1881)	Vig.	Bright satiny red, tinged with vermilion, globular shape, very large	2	8	0
75 Gloire de Dijon, T.		Yellow, shaded with salmon, very large and full, a superb rose; one of the hardiest and best	0	4	0
76 Gloire de Bourg la Reine	Vig.	Brilliant reddish scarlet; the brightest colour yet known in a rose; large and full	1	8	0
77 Gloire de Vitry	Free.	Dark rose, splendid shape, large and magnificent	0	8	0
78 Glory of Cheshunt (1831)	Vig.	Rich shaded crimson, very free flowering, useful for pillars.	0	8	0
79 Gloire de Ducher		Purple, illuminated with crimson and scarlet; extra large and double, quite distinct and fine	0	8	0
80 Glory of Waltham		Crimson; a very fine rose	1	0	0
81 Guillaume Gillemot (1881)	Vig.	Beautiful soft carmine pink, reflecting a silvery tint, globular shape; very large and full	2	0	0
82 Helene Paul	Vig.	Beautiful white, sometimes slightly shaded with pink, very large globular-shaped.	0	8	0
83 HENRICH SCHULTHEIS.		Very vigorous; flower large, of first-rate form, and very full; colour very delicate pinkish rose, a great improvement in this shade; very sweet-scented; thoroughly perpetual; a cross between *Mabel Morison* and *Mons. E. Y. Teas*	3	0	0
84 Hon'ble Geo. Bancroft			1	0	0
85 Horace Vernet	Vig.	Reddish purple, shaded with dark crimson; very large, a splendid rose	0	8	0
86 Horasonie			1	0	0
87 John Keynes		Bright reddish scarlet, shaded with maroon; large and full	1	0	0

NAMES.	HABITS.	DESCRIPTIONS.	Rs.	A.	P.
88 John Hopper	Vig.	Beautiful pink, large, full, and of good form; abundant bloomer	0	12	0
89 John Stuart Mill	Free.	Bright clear red, beautiful form, fine shell petal, fine flower	0	8	0
90 Jules Cretien	Free.	Very bright crimson, shaded; very large and full, of fine form	2	8	0
91 Karolinde Sansal			0	8	0
92 La Reine	Free.	Tinted with lilac; large and full	0	8	0
93 La Souveraine	Vig.	Lively carmine, tinged white; very large, full, cupped	0	8	0
94 La France		Beautiful pale peach, rose centre, very large, full, and free bloomer; sweet-scented	0	8	0
95 L'Esperance	Free.	Bright cerise carmine; large and full	2	8	0
96 LITTLE GEM	Mod.	A miniature moss rose, forming compact bushes densely covered with small double crimson flowers, beautifully mossed. It is of charming effect in the garden and most valuable for bouquets or vases	5	0	0
97 Lord Macaulay	Vig.	Bright velvety crimson; large, full, and beautiful form	0	8	0
98 Louis Corbie	Free	Bright pink, red centre	2	8	0
99 Louis van Houtte	Mod.	Velvety crimson; very large and full; a grand rose	2	8	0
100 Louis Philippe de Angers		Dark crimson	0	8	0
101 Madame Anna Gerold, 1882	Vig.	Bright pink clouded with deep carmine, cup shaped; large and full	2	8	0
102 Madame Alice Dureau		Clear rose colour; very large, full, and of good form; very sweet; a first class rose	1	0	0
103 Madame Bertha Montchauveau.	Free.	Silvery rose, brighter in the centre; very large and full	1	8	0
104 Madame Caillat	Free.	Bright pink; large, full, and good form	0	8	0

	NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
105	Madame Boll..	Vig.	Deep rose, very large and full, the petals of good substance, and foliage handsome	1	0	0
106	Madam Charles Carpelet	Vig.	Light crimson, large and full, splendid form, extra good	0	8	0
107	Madame Charles Wood	Mod.	Crimson shaded with purple; very large and of great substance	0	8	0
108	Madame Clemence Joigneux.	Vig.	Pinkish carmine, very large and full	1	8	0
109	Madame Crosy, 1882	Vig.	Delicate Chinese pink, large and well formed, foliage deep green	2	8	0
110	Madame Edward Oray			0	12	0
111	Madame Edward Morren		Flowers large and of brilliant red colour	1	4	0
112	MADAME EUGENE LA-BRUYERE.		Salmon pink, the back of the petals a deeper colour, large, full, and well formed; vigorous growth	3	0	0
113	Madame Eugene Verdier	Free.	Beautiful satiny pink, of the form, very large and full...	2	8	0
114	Madame Ferdinand Jamain.	Free.	Bright rosy carmine, very large, with large-cupped petals, very highly scented.	0	8	0
115	Madame Fillion	Free.	Pink, very large, full, and well formed	0	8	0
116	Madame F. Bruel, 1882	Vig.	Pinkish carmine; large and free flowering; very vigorous	2	8	0
117	Madame Gabriel Luizet	Vig.	Beautiful satiny pink; very large	2	8	0
118	Madame Georges Vibert	Free.	Soft pink, turning to deeper pink in the centre; large and full	2	0	0
119	Madame Hector Jaquin	Vig.	Rose, shaded with lilac; large and good	1	0	0
120	Madame Hippolyte Jamain.	Vig.	White, lightly tinted rose, extra large	2	8	0
121	Madame Jacquier	Vig.	Beautiful purple; very large and full, globular; fine foliage...	2	8	0

	NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
122	Madame Jules Grévy, 1882	..Vig.	Bright salmon pink, changing to white towards the centre	3	0	0
123	Madame Knorr ...	...Mod.	Bright glossy pink, large and very double...	2	8	0
124	Madame Lacharme ...	...Vig.	White; very large	2	0	0
125	Madame Lavet, T. ...	...	Yellow shaded violet; a fine variety	2	4	0
126	Madame Marie Finger	...Mod.	Bright flesh-coloured, pink deeper in the centre, globular form, large	0	8	0
127	Madame Marie Rœderer, 1882	Vig.	Beautiful bright pink, clouded with carmine, large and full	3	0	0
128	Madame Marthe D'Halloy	...Vig.	Soft carmine, good form, large and full	3	0	0
129	Madame Masson ...	...	Red crimson	0	8	0
130	Madame Montet, 1881	...Vig.	Beautiful soft pink; petals wide; flower large... ...	3	0	0
131	Madame Moreau ...	...Mod.	Fine crimson, very large, full and perfect form; the petals are large, and of good substance	0	8	0
132	Madame Nachury ...	...Vig.	Fine satiny rose; very large and full......	0	8	0
133	Madame Prosper-Langier	...Vig.	Bright rose, flower very large, perfect shape, large petals	2	8	0
134	Madame Rosalie de Wincop	.Vig.	Beautiful salmon pink; the edges of the petals slightly lighter in colour; large, full, and globular-shaped ...	3	0	0
135	Madame Rothschild	...Mod.	Beautiful bright pink; very large, handsome foliage ...	2	8	0
136	Madame Sophie Fropot	...Free.	Fine bright pink; large and full	2	0	0
137	Madame Victor Verdier	...Free.	Beautiful cherry red, large and full, exquisitely cupped form...	0	8	0
138	Madame Vigneron ...	...Free.	Light rose, large and fine form	2	8	0
139	Mademoiselle Bonnaire	...Mod.	White, centre pink; flowers medium size, free blooming, and very beautiful ...	2	0	0
140	Mdlle. Catherine Soupert	...Vig.	White, shaded with pink; large and full	2	8	0

	Names.	Habits.	Descriptions.	Rs.	A.	P.
141	Mademoiselle Emma All	Vig.	Brilliant carmine rose; large and full; globular form	2	8	0
142	Mdlle. Emilie Fontaine, 1882.		Crimson, tinged with fiery red, large, full, and well formed	3	0	0
143	Mdlle. Eugene Verdier	Mod.	Beautiful satiny Chinese pink, the reverse of the petals silvery white; very large and full	2	0	0
144	Mademoiselle Marie Rady	Vig	Bright crimson, very large and full	0	8	0
145	Mademoiselle Marie Verdier.	Free.	Most beautiful bright satiny pink, broad petals, flowers very large and full, on stiff stems	2	0	0
146	Magna Charta	Vig.	Fine bright rose; very large, double, and fine form	0	8	0
147	Marechal Valliant	Vig.	Bright crimson, very large and well formed	0	8	0
148	Marechal Niel, T.	..	Rich yellow	0	4	0
149	Marechal Forey	...	Purplish crimson	0	8	0
150	Marguerite Brassac	Free.	Deep velvety carmine; very large and fine form	0	8	0
151	Marguerite de St. Amand	Free.	Magnificent bright pink; very large and full, fine form, a first class rose	0	8	0
152	Marie Baumann	Free.	Brilliant crimson, large, full, and fine form; a grand showy rose	1	0	0
153	Marie Guillot, T.	Free.	Beautiful white, tinted yellow; large, full, and fine form	2	4	0
154	Marie van Houtte, T.	Vig.	Flowers large and full; yellowish white, edged with rose	1	0	0
155	Marquise de Castellane	Vig.	Beautiful bright rose; very large and full, form perfect, blooms freely	0	8	0
156	Marquise de Gibot	Vig.	Beautiful pink, large and full; a fine showy rose	1	0	0
157	Masterpiece	Vig.	Bright rosy crimson; large, full, and of perfect globular shape	2	8	0
158	May Turner	Vig.	Beautiful Chinese pink; very full and large	1	0	0

NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
159 MERVEILLE DE LYON	Vig.	Beautiful pure white, tinted with satiny pink in the centre; cup-shaped, very large, sometimes measuring more than four inches in diameter; full, of perfect shape, and opens well; it somewhat resembles *Baroness Rothschild*, from which it is a seedling, but differs in its being much larger, fuller, and of a lighter colour.	3	0	0
160 Mrs. Elliot	Vig.	Rosy purple	0	8	0
161 Miss Ingram	Vig.	White, centre blush; large and globular	0	8	0
162 Monsieur Etienne Dupuy	Vig.	Beautiful bright pink, the reverse of the petals is very large, full, fine form	2	8	0
163 Monsieur E. Y. Teas	Mod.	Rich cherry red; large and beautifully formed	0	8	0
164 Monsieur Gabriel Tournier	Mod	Carmine, very large, full, fine form	1	0	0
165 Monsieur Jules Mougos	Vig.	Brilliant carmine pink; full, very large, and of good cupped form	3	0	0
166 Monsieur Noman	Mod.	Delicate rose colour; large, full, and well formed	0	8	0
167 Monte Christo		Dark crimson	0	4	0
168 Mrs. Baker		Carmine red	0	12	0
169 Murillo		Rosy purple; large and fine	0	8	0
170 Nancy Lee			1	0	0
171 Oxonian	Mod.	Beautiful shaded rose; large, full, and fine globularform; shell like petal	0	8	0
172 Paul Neron	Vig.	Deep pink, very large and full; the largest rose in cultivation	0	4	0
173 Peach Blossom	Free.	Flowers large, full, and finely formed; colour of peach blossom	2	8	0
174 Penelope Mayo	Free.	Bright carmine red; a large flower of great substance and perfect form	0	12	0

Names.	Habits.	Descriptions.	Rs.	A.	P.
175 Perfection des Blanches	Vig.	Beautiful pure white, of medium size, full, fine form	0	8	0
176 Pio Nono		Brilliant pink	0	4	0
177 President, T.		Pale rose, shaded salmon	1	0	0
178 President Schlachter	Mod.	Deep velvety crimson, shaded purple; very large and full.	2	8	0
179 President Thiers	Vig.	Flowers fiery-red, globular, very large, and full	2	8	0
180 President Mass		Deep red, large and fine	0	8	0
181 Pride of Waltham	Vig.	Delicate flesh colour, shaded with bright rose, flowers large and full	2	8	0
182 Prince Arthur	Vig.	Deep crimson; a fine rose	0	12	0
183 Prince Camille de Rohan	Free.	Intensely dark velvety crimson; large and full; one of the darkest roses in cultivation	0	12	0
184 Princess Mary of Cambridge	Free.	Beautiful pale rose, large and full; abundant bloomer	0	8	0
185 Prince of Wales			2	8	0
186 Perle des Jardins	Vig.	Straw colour, sometimes canary yellow, centre orange yellow; very large and full; one of the best	2	0	0
187 Queen Victoria	Vig.	White, shaded pink; large and full	1	8	0
188 Queen of the Bedders		Flowers bright crimson, a free bloomer	1	0	0
189 Queen of Waltham		Beautiful rosy cherry, a very distinct and lovely colour; in sunny weather the circumference of the petals become darker than the base, a novel and strikingly beautiful feature	1	8	0
190 Queen of the Reds	Mod.	Bright red, blooms freely in clusters	0	12	0
191 Rev. J. B. Camm		Very bright rosy pink, globular form, a first rate flower	2	4	0
192 Red Gauntlet	Vig.	Bright scarlet crimson, shaded with deep rose; very large and full	3	0	0

	NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
193	Reine du Midi	Vig.	Delicate rose; large, full, and beautifully cupped; a first class rose, always good, free blooming	0	8	0
194	Reine Marie Henriette		Fulgent crimson, large and full, magnificent and effective. It is of climbing habit	2	0	0
195	Reynolds Hole	Vig.	Deep rich crimson, shaded maroon, a good dark rose	0	12	0
196	Richard Laxton	Free.	Reddish crimson, fine cupped shape	2	8	0
197	Richard Wallace	Vig.	Soft pinkish scarlet; full and very well formed	0	8	0
198	Robinhood			2	0	0
199	Rosieriste Harms	Vig.	Velvety scarlet, large and full	2	8	0
200	Rosieriste Jacobs (1881)	Vig.	Rich velvety red, clouded with black, of flat form, large and full	1	0	0
201	Royal Standard	Free.	Beautiful soft rose; a most desirable rose	0	8	0
202	Seneteur Vaisse	Vig.	Deep red; large and full; free blooming	0	8	0
203	Sir Joseph Paxton, B.		Brilliant rose	0	4	0
204	Sir Garnet Wolseley	Free.	Fine vermilion, shaded carmine; very large, fine form.	0	8	0
205	Sir Walter Scott		Rosy lilac	0	4	0
206	Sophie Coquerell	Vig.	Blush, centre flesh, very large and full	2	0	0
207	Souvenir d'Arthur de Sansal.	Free.	Fine clear pink, large; very fine flower	1	8	0
208	Souvenir d'Auguste Riviere	Free.	Deep crimson, good form; nicely scented	1	0	0
209	Souvenir d'un Ami	Mod.	Rich salmon pink, well shaped, cupped	1	8	0
210	Souvenir de la Mére Fontaine.	Vig.	Flowers large, full, and well formed; beautiful bright	1	8	0
211	Souvenir de la Malmaison			1	4	0
212	Souvenir de la Monsieur Boll.		Cerise red; colour uniform throughout; very large, full, and of perfect form; very sweet; one of the best	0	8	0
213	Souvenir de la Paul Neron	Vig.	Fine white-edged with pink; large, full, and fine form	1	0	0

	NAMES.	HABITS.	DESCRIPTIONS.	RS.	A.	P.
214	Souvenir de Spa	Mod.	Flowers large, full, and very finely formed; colour bright fiery crimson	0	8	0
215	Souvenir de Victor Verdier	Free.	Brilliant red, clouded with carmine; large, full of good form	0	12	0
216	Star of Waltham	Free.	Bright pink; good shape; large and full	0	12	0
217	Sydomine		Beautiful rose of dark red colour and very sweet scented	2	8	0
218	Sweet Briar		Flowers not attractive, leaves scented	0	4	0
219	Thomas Mills	Vig.	Flowers large, full, and of fine cup shape, bright rosy carmine	0	8	0
220	Triomphe de France		Beautiful carmine; large, full, and of very perfect form, a free blooming variety of great merit	2	4	0
221	Verdiflora		Flowers green; a curious variety	0	4	0
222	Vicomte Vigier	Free.	Dark purplish crimson; large and distinct	0	12	0
223	Victor Verdier	Free.	Beautiful deep pink, large and well formed	0	12	0
224	Violette Bouyer	Vig.	White, slighly tinged with a very soft flesh colour; flower large and well formed	3	0	0
225	WHITE BARONESS		A white sport from *Baroness Rothschild*; much fuller than *Mabel Morrison*	3	0	0
226	William Charles Wood		Dark red, large and full, form cupped	0	8	0
227	Xavier Olibo	Free.	Velvety black, shaded with amaranth; large and full	0	8	0
228	Edward Morren	Vig.	Glossy pink in the way of Jules Margotting, but of a fresher colour, of better form, and much larger	0	8	0

NEW ROSES;

LATELY IMPORTED

By a Calcutta Nurseryman.

1	Alexandre Dupont	Purplish red, shaded vermilion.
2	Alphonse Soupert	Bright rose
3	Antoine Chantin	Deep cerise red.
4	Avocat Lambert	Satin rose, pale centre.
5	Andre Schwartz	Deep red.
6	Antoine Mermet, T.	Deep rose.
7	Beniot Comte	Bright red, shaded vermilion.
8	Baronne de Livety, T.	Deep yellow, shaded rose.
9	Belzunce	Vermilion, shaded with carmine, very large and full.
10	Charles Lamb	Bright red, very beautiful.
11	Col Felex Breton	Velvety crimson.
12	Countess of Pembroke, T.	Soft satin rose colour
13	Clothilde Supert, T.	Rosy carmine.
14	Camoens, T	Rose, shaded yellow.
15	Comtesse Cahen D'Auvers	Fine bright rose, very pleasing, large and full
16	Distinction, T.	Shaded peach, sometimes washed satin rose.
17	Directeur Lephard	Blackish purple, shaded red
18	Duke of Marlborough	Bright red, shaded with crimson, large and full, perpetual flowering, a very promising new rose
19	Eclar	Fiery crimson.
20	Edward Gantier, T.	Yellow out petals, white tinged rose.
21	Empress	White with pink centre.
22	Ella Gordon	Cherry colour.
23	Etendard de Jenne	Creamy white
24	Francisgne River	Cerise, shaded carmine
25	Frederick Cavendish	Bright scarlet.
26	Grandeur of Cheshunt	Light crimson
27	Gilbert	Velvety red, shaded maroon and carmine.
28	HER MAJESTY	A fine new rose introduced in 1886.
29	Hon Edith Guilford, T.	Flesh colour, centre salmon rose.
30	Joseph Metral	Dark velvety red
31	Joachim de Bellay	Vermilion, shaded red.
32	Jean Drivon	White edged and shade of pink.
33	Lord Bacon	Deep crimson, shaded black
34	La Khedive	Crimson, shaded purple and red

NEW ROSES—*continued.*

35	Lecog Dumesnil	... **Red, shaded crimson and violet.**
36	Lady Mari Fitzgerald, T. ...	... Flesh colour.
37	Mad. Marie Legrange ...	... Red, shaded carmine.
38	Mad. Marie Closon ...	... Pale rose.
39	Mad. Bertha Mackait ...	... Rosy carmine.
40	Mad. Etienne Levet, T. ...	... Cherry red, shaded coppery yellow.
41	Mad. Rambeaux	... Rosy carmine.
42	Mad. Cusin, T.	.. Purplish rose centre, tinged yellow white.
43	Mad. de Wathville, T. ...	... Salmon white, bordered rose.
44	Mdlle. Marie Digat ...	... Deep crimson.
45	Mdlle. Julie Ganlain ...	... Bright rose, shaded salmon.
46	Mdlle. Louise Auvier ...	... A French variety.
47	President Sinclar ...	... Velvety red, shaded purple.
48	Perle d'Or	... Yellow.
49	Princess de Bearn ...	... Rich blackish crimson, shaded with vermilion; large, full, and globular.
50	Pacquerette	... Small and double, pure white, produced in panicles. It is A CURIOUS MINIATURE ROSE.
51	Paul Verdier	... Bright rose.
52	Prosper Langier	... Scarlet red, shaded carmine.
53	QUEEN OF QUEENS ...	... Pink, with blush edges, large and full, of perfect form and a true perpetual flowering rose, every shoot being crowned with a flower bud. It is decidedly the finest rose of its colour. "Large, full, and finely formed flower"—*Gardeners' Chronicle.* "A first-rate variety, both for garden and exhibition table."—*The Garden.* "The blooms are large, full, and of good form, the colour being a very distinct pink shade, most delicate and pleasing."—*Journal of Horticulture.*
54	Souvenir de Leon Gambetta	... Carmine red.
55	Souvenir de Reve Leveque	... Purplish red, shaded crimson.
56	Souvenir de Reine Lavigne	... Reddish purple, shaded deep crimson.
57	Souvenir de Therese Levet, T.	... Deep red.
58	Souvenir de Rosiereste Rambeaux	... Yellowish white with deep margin of pink.
59	Secretaire Nicholas ...	... Deep red, shaded purple.

FRAGARIA[*] VESCA,[†] *The Strawberry*,

Grows freely and ripens its fruit in the Deccan, but it is on the hills, at an altitude above 3,000 feet, that the most success is met with. A thoroughly well-worked loamy soil is required, and it may be enriched by a liberal supply of whatever manure is most convenient. There is little danger of giving too much manure, provided it is well mixed with the soil. Propagation is generally by runners, which should be taken from the parent at the end of the rainy season and planted in beds about eighteen inches apart; if these show an inclination to throw out running shoots, they should be pinched off. A liberal supply of water twice a week is necessary, and during the fruiting season, from January to May, frequent supplies of liquid manure added to the water will be useful. During this time any disposition to throw out runners should be checked; but, after all, the fruit has been gathered, the plants should be allowed to make runners, which are wanted for next year's plantation.

The above is a general account of strawberry culture and may be supplemented as follows:—

The soil must not be stiff clay; if inclined to be sandy, special precautions must be taken to "mulch," that is, to protect from sun and air by a thick coating of moisture-retaining decayed manure; and if the plants have made good growth, to tread the soil firmly, close to the roots, so as to increase the power of retaining moisture and check leaf development. Water must be given frequently in sufficient quantities to keep the soil moist. In this connection it may be noted that a wet surface does not indicate a moist soil. On some soils the upper two inches may be a wet puddle, while the plant is dying from want of water. When the flowers appear, clean straw should be spread on the "mulching" of manure to keep the fruit clean.

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[*] *Fragaria*, from *fragrans*, sweet-smelling.

[†] *Vesca*, edible.

The strawberry is such a favourite fruit that the demand for it is unlimited, and there is a temptation to continue growing it without observing due rotation of crops. When this course is pursued the soil becomes exhausted of some essential ingredients which manure does not restore with sufficient rapidity and in consequnce the fruit becomes smaller and smaller until it is unprofitable to cultivate. The sort cultivated is supposed to be getting worn out and superior varieties are called for from other countries. From the extra care and attention that new products generally receive, a slight improvement is met with, but the result is not completely successful, because it is the soil that is being worn out, not the variety.

The especial ingredients of the soil that the strawberry removes chemistry has not yet clearly indicated, and in the meanwhile fresh soil to grow our strawberry crops on for a few years during which the old stawberry beds are under other crops and a further supply of the scarce ingredient being dissolved out of the soil basis is the treatment indicated. Other fruit crops show the same kind of exhaustion of the soil, but not to such a striking degree as the strawberry, because the strawberry is an herbaceous plant with short roots little adapted to search out the scarce ingredients of the soil that may be necessary and in a state of nature protects itself by producing runners which place the plant of the succeeding season at a considerable distance from the exhausted site occupied by its parent.

KIND OF MANURE DESIRABLE.

Admitting that the soil we are dealing with is not exhausted by strawberry culture, the kind of manure desirable is plainly shown in some experiments by Mr. Ridley in the Lucknow Horticultural Garden. 556 square feet of land gave when manured with—

25	maunds	nightsoil	355	oz. of fruit.
35	,,	cowdung	310	,, ,,
37	,,	sheepdung	316	,, ,,
Unmanured			189	,, ,,

The manure was applied in August, 2½ months before the plants were put in, and the soil turned over several times in the interval.

SORTS OF STRAWBERRIES.

This fruit is like the vine in so far as the occurrence of local varieties which appear specially suited for particular climates is concerned, and because, for instance, strawberries of a sort grow near Mahableshwar it does not follow that Keen's Seedling and other choice sorts will grow there.

Local varieties in India have not yet been described and named. In starting strawberry cultivation it is advisable to take the varieties that are found to thrive at the station nearest the proposed plantation and when success in the culture of that sort has been attained send to a nurseryman for a few plants of the best known sorts. If any of them prove suitable for the local climate it is easy to propagate the desireable variety, but for permanent improvement cross breeding between the newly introduced and the established varieties is necessary.

TO PREVENT INSECT AND FUNGOID PESTS ON THE STRAWBERRY.

Select only clean healthy runners, transplant with as little soil as practicable, lay a quantity of dry rubbish on the old plants, and set it on fire.

PERSICA VULGARIS, *Peach.*

The delightfully luscious taste of the peach in Europe and the high value placed on the fruit wherever it can be produced of good quality, has induced many attempts to grow the same class of fruit in India, but with very little success so far. We have abundance of a fruit called by courtesy a peach, but it is very different from what bears that name in England, our own want of success is, no doubt, caused by working on a wrong tract. Experience has proved that because a particular variety of a fruit thrives in one climate that is not a reason to expect it to do so in another.

Many plants of the fine varieties of peach have been introduced from Europe, and much time and trouble has been devoted to the trees without any satisfactory result, because the method used was wrong. We should not expect to change the nature of that particular tree so far as to induce it to bear fruit in a climate very different from that in which it was originally produced. We should get a collection of the fine varieties from Europe, plant them with the common variety that is found to bear well, cross-fertilize the flowers by applying the pollen of the select variety to the stigma of the variety that bears fruit, and *vice versâ*, because it will often occur that the pollen of the common poor variety that bears fruit will contain the protoplasm necessary to induce the superior variety to bear fruit.

REARING LOCAL RACES OF FRUIT.

Having obtained cross-bred fruit, the seed should be sown. In sowing the seed it is *not* necessary to take the shell off. The seedlings. will give probably 1 or 2 per 1,000 that are much superior to the common variety; but even 1 per 1,000 would be a great improvement, because that plant can be propagated to any extent by budding, and the cross-fertilization, being repeated with it, a *race* of varieties suited for the local climate would be procured.

The process described is carried on in Europe and America by many people, who in some instances make considerable fortunes by disposing of the cross-bred plants they raise to nurserymen, who propagate and sell the plants, and the tendency of this work is what? The French, the Germans, the English, and Americans are the foremost peoples in this respect nearly in the order given, and they are certainly not laggards in general civilisation. Whether the production of high class fruit is a cause or an effect of civilization we will leave to others to enquire, suffice it if we have established that it is a work fitted for and requiring the highest intelligence and not unworthy of attention from the hereditary intelligent classes of India.

The common peach (*shuft aloo, ároo*) thrives at an altitude of 3 to 4,000 feet with very little, if any, irrigation, and at 1,000 feet altitude with irrigation. At low altitudes it is generally necessary to arrest growth when the rains are over to induce flowering. For this purpose the common plan is to take the soil out from the roots, leave them exposed, and withhold water—a thorough digging with a sharp grubber will have the same effect—most of the leaves will fall off, and the buds that would have produced only leafy shoots if the growth had not been arrested, will bring forth flowers when growth recommences about six weeks later. At the same time the weakly wirelike shoots that are always present in abundance and any decayed branches, as well as about half the length of long shoots of the past season, should be pruned away. When the growth has been sufficiently long arrested and the plump buds, which observation will soon enable any one to distinguish as flower and not leaf buds appear If the weather continues dry a watering should be given; this causes the flower buds to open, and shortly afterwards a supply of old manure should be mixed with the soil withdrawn from the roots and the mixture returned to its place. After this water, sufficient to keep the soil moist, should be given, and thinning the fruit attended to.

THINNING THE FRUIT.

If the cultivator does not attend to the thinning, nature will do it for him at the cost of a large quantity of the sap that would have gone to the development of the fruit, which will be lost by the half grown fruit falling off, if the tree is permitted to carry more fruit than it is capable of maturing. There is nothing more certain than that greed overreaches itself, and it is often displayed in the man who gloats over his too heavily laden branches, which bear the fruit until it is half grown and then throw off three-fourths of it, while the removal of half when very young would have been sufficient.

The following varieties are available at the Government Garden, Lahore:

Barington, 6 annas.
French Mignonne, 6 annas.

(These two do best in the hills: they do not ripen fruit well in the plains.)

Kingston, ripens well, June and July, 6 annas.

Royal George, 6 annas.

Violette hâtive, 6 annas.

Wellington, 6 annas.

China flat, 2 annas.

China flat, superior, 4 annas.

Large Noki (native peach), 2 annas.

Small Noki (delicate flavour), 2 annas.

Pesháwar (fine variety), 2 annas.

For cross-breeding there is more probability of success with early than with late varieties. The best early varieties grown in England are:—

ALEXANDER,
BELLEGARDE,
CONDOR,
. HOGG,
EARLY RIVER,
GROSS MIGNONNE,
HALE'S EARLY,
NOBLESSE,
RIVER'S EARLY YORK,
ROYAL GEORGE,

which are procurable from any nurseryman in England.

PRUNUS COMMUNIS, *Plum, Alucha.*

The Superintendent of the Government Agri-Horticultural Garden at Lahore writes:—

"The common yellow plum is not very good, but an improved variety has been obtained from Saharanpur, which has *the stone loose.* The finer European 'egg' plums and 'greengages' can only be grown in the hills." The following sorts are available at the above garden:—

Yellow plum, 2 annas.
Do. Shálimar variety, large, 3 annas.
Saharanpur variety, 3 annas.
Bukhára plum (black or dark red), 2 annas.

PRUNUS AMYGDALUS,† *Almond Tree.*

The true almond tree is easily raised from fresh almonds imported from the Persian Gulf, and is very showy when in flower with its numerous rosy blooms, but does not fruit in India, and the same must be said of the apricot, *Prunus Armeniaca* except in a few places far north with a specially cool climate.

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* *Prunus*, the name used by Pliny for the plum tree.

† *Amygdalus*, from *amyso*, to fret or wound, in allusion to the shell of the nut having fissures.

PYRUS[*] MALUS,[†] *Apple.*

The apple tree grows freely at the altitude of Poona, 1,800 feet, but does not give fruit worth the time and trouble required to obtain it, because the climate is hot throughout the year and the trees do not get the rest necessary to form good fruit. At Bangalore, altitude 3,000 feet, the apple bears well, and much information on its culture will be found in the Calendar for Bangalore.

The chief points in apple cultivation are a deep loamy soil, the trees about 12 feet apart, and in a plot by themselves, so that irrigation may be given or withheld, as is desirable. A thorough resting during October, brought about by withholding water and either by opening the roots and pulling off the leaves or by root-pruning, that is, digging round the tree at a distance of from 2 to 4 feet from the stem in proportion to the size of the tree and cutting about half the roots that extend beyond the line. It is advisable to divide the circle at the base of the tree in four parts and root-prune two opposite parts one year and the remainder next year—for instance, the east and west quadrants may be pruned one year and the north and south the following year. The pruning of dead and weakly branches and of a third of the length of all long soft shoots must be attended to at the same time. A heavy supply of old manure after the fruit is set and abundant watering once in three or four days during the next two months will be necessary. As the fruit begins to ripen, water should be reduced.

The following varieties can be supplied by the Horticultural Garden, Lahore, but they will not fruit in the plains:—

Price 12 annas each.

Cox's Orange Pippin.
Devonshire Quarrendon.
Dutch Codling.
Duke of Devonshire.
Golden Kenneth.
Hawthornden.
King of Pippins.
Royal Pearman.
Wellington.

[*] *Pyrus*, from the Celtic for a pear.

[†] *Malus*, the name for the apple used by Varro.

The apple can easily be propagated by cuttings and layers in this country—cuttings should be made of the lower part of the shoots that are thrown out from the base of the stem freely.

PYRUS COMMUNIS,[*] *Pear*, *Naspati.*

The Superintendent, Agri-Horticultural Garden at Lahore, says:—"These are kept for sale to hill gardens. Except the common *naspati* (fairly good for stewing) the pear tree will not fruit in the plains." The following sorts are available at the above garden:—

Common country pear, 3 annas.
Louise Bonne, 12 annas.
Hughes' Bergamot, 12 annas.
Victoria, 12 annas.
Marie Louise, 12 annas.

Naspati thrives in Southern India at an altitude of 3,000 feet and needs the culture detailed for the apple.

CYDONIA[†] VULGARIS,[‡] *Quince.*

This tree grows and fruits well at an altitude of 4,000 feet, but is not much valued. Its chief importance in England is as a stock to graft the pear on.

RUBUS[§] LASIOCARPUS,[¶]
The raspberry of the Western Ghauts, *Rajpooree.*

This fine fruit is of easy culture at an altitude over 3,000 feet, but at lower elevations does not repay the cost of cultivation, although it grows well. At the proper altitude cuttings of the lower part of the stem put in during the rainy season bear fruit during the following hot season if the weeds are kept down. At the annual dressing about the end of the rainy season the stems that have fruited should be cut down, and any branches that have not fruited should be arched over and tied to those of an adjoining plant, they will probably fruit early the following season.

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[*] *Communis*, universal.

[†] *Cydonia*, from *kydon* in Crete, where the tree grew in large numbers.

[‡] *Vulgaris*, common.

[§] *Rubus*, from the Celtic for red.

[||] *Lasiocarpus*, having hairy fruit.

RUBUS ROSÆFOLIUS,[*]

A small bramble-like plant bearing double white flowers like miniature roses during the cold season, has long been established in Calcutta gardens. Its native habitat extends from the Himalaya to Java, therefore its cultivation in India presents no difficulty. Propagation is effected by division.

ERIOBOTRYA[†] JAPONICA,[‡] *Loquat*,

This fruit tree thrives well in the Northern Provinces and in Western India is delicate, but when planted in sandy loam soil, kept at an equal state of moisture, bears fruit well in the Deccan. Plants raised from seed are, as is usual with fruit trees, of comparatively little value, therefore the seedling plants should be grafted to a select variety.

SPIRÆA[§] BETULIFOLIA.[¶]

A shrub about 2 feet in height having alternate simple leaves with obsolete stipules. The leaves are usually of a very pale green, oval, wrinkled, and toothed near the apex, much resembling the beech tree leaf. It bears in the hot season large corymbs of creamy white flowers. The northern side of a house and a regularly watered soil are desirable in growing this sweet little shrub. Propagation is effected by division.

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[*] *Rosæfolius*, having leaves like the rose.

[†] *Eriobotrys*, from *erion*, wool, and *botrys*, a bunch, in allusion to the woolly branches and inflorescense.

[‡] *Japonica*, from Japan.

[§] *Spiræa*, the name used by Theophrastus, probably from *speiras*, to wind in allusion to the fitness of the plants for garlands.

[‖] *Betulifolia*, having leaves like the beech tree,

SAXIFRAGACEÆ.*

This family includes the true gooseberry of temperate climates, *Ribes grossularia*, not the Cape gooseberry, *Physalis Peruviana*, which is so common in this country.

The true gooseberry has often been tried and proved a hopeless subject within our bounds.

SAXIFRAGA SARMENTOSA.†

A creeping herbaceous plant rejoicing in numerous popular names, such as Aaron's Beard, Creeping Sailor, Mother of Thousands, and Wandering Jew, which to some extent describe its habits in temperate climates. In this climate it makes a very pretty hanging basket plant with circular crenate leaves, hairy and red beneath; in the variety *tricolor* blotched with creamy white, and suitable for the chick conservatory. Propagate by division.

HYDRANGEA‡ HORTENSIS.§

An undershrub, in this country seldom attaining more than 1½ feet in height and having opposite, broadly ovate, serrate, acuminate leaves, and bearing large terminal corymbs of flowers in two forms, small fertile, and large sterile, the sterile flowers being the developed calyx lobes only. The colour of the flower varies from pure white, through rose, to blue, and, like many other flowers of the same colours, varies frequently even on the same plant.

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[*] *Saxifragaceæ*, from the genus *saxifraga*, from *saxum*, a rock, and *frango*, I break, from its reputed efficacy in stone in the bladder.

[†] *Sarmentosa*, producing long, naked branches.

[‡] *Hydrangea*, from *hudor*, waters, and *aggeion*, a vessel, in allusion to the cup-shaped fruit.

[§] *Hortensis*, of gardens.

The northern side of a house, regular watering, and a rich loamy soil are the conditions desirable for its culture. Propagation is done by cuttings inserted in a close frame.

CRASSULACEÆ,* *The Stone Crop Family.*

A small tribe of plants having very succulent leaves and carpels, usually as many as the petals with a scale at the base of each. The separate carpels easily distinguish this family from *Portulacaceæ*, which has a similar succulent habit.

BRYOPHYLLUM† CALYCINUM.‡

A succulent, erect-growing, perennial, herbaceous plant having opposite simple or tripartite leaves and terminal panicles with opposite branches bearing pendulous flowers having a long inflated calyx with four valvate lobes.

This plant is of general occurrence near villages in moist districts, but appears not to have a vernacular name. It is useful in teaching botany by showing the typical formation of the carpel to be a leaf bearing seeds on its margins. In a moist slightly shaded position it requires no cultivation, and is propagated by the leaves, which fall and produce young plants from their crenatures.

KALANCHOA§ FLORIBUNDA.||

A smooth succulent perennial having opposite simple or ternate leaves of an olive green colour and producing cymes of clear yellow octandrous flowers during the cold season.

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* *Crassulaceæ*, from the genus *crassula*, from *crassus*, thick, in allusion to its leaves.

† *Bryophyllum*, from *bryo*, to sprout, and *phyllon*, a leaf, in allusion to its leaves giving out buds.

‡ *Calycinum*, alluding to the remarkable calyx of the flower.

§ *Kalanchoa*, from the Chinese name of one of the species.

|| *Floribunda*, having numerous flowers.

This plant is used for bedding purposes in the Allahabad public gardens, its remarkable colour contrasting with the bright alternantheras which surround it.

COTYLEDON* SPATHULATA,†

Which greatly resembles the Stone Crop of English cottages with its rosulate leaves ½ an inch in length, is a favourite bedding plant at Ootacamund, and in similar climates makes a neat edging for flower beds. When brought down to the plains it lives only a few months.

SEDUM‡ SARMENTOSUM.§

A dwarf succulent plant useful for making a green carpet in a moist climate or in the conservatory. Its leaves are opposite or in fours, ½ inch in length, linear, terete, or slightly flattened and pointed. Flowers bright yellow, less than ¼ inch, in elongated cymes. Easily propagated by cuttings as a dressing round the base of the stem of a tree. It does particularly well in Bombay.

COMBRETACEÆ ||

Is a small family, including some very choice garden climbers and large timber trees. The climbers are propagated by layers and cuttings and the trees by seeds. Planting in the ground instead of pot culture is specially desirable in this family.

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* *Cotyledon*, from *kotyle*, a cavity, as in the hip joint, in allusion to the form of the leaves of some species.

† *Spathulata*, like a small spoon or *spatula*.

‡ *Sedum*, from *sedeo*, to sit, in allusion to the dwarf growth.

§ *Sarmentosum*, producing long shoots or runners

|| *Combretaceæ*, from the genus *combretum*, a name given by Pliny to a climbing plant.

QUISQUALIS[*] INDICA,[†] *The Rangoon Creeper*,

Is a very showy climber. The flowers change colour as age increases, therefore flowers varying from white to crimson may be seen on the plant at the same time. Any good garden soil is suitable. Propagation by layers or cuttings.

COMBRETUM (POIVREA)[‡] COCCINEA[§]

Is one of the most beautiful plants in cultivation ; the foliage is of a luxuriant dark green, and the flowers, which are produced in elegant racemes, are of a brilliant scarlet colour. It succeeds well when planted in a pot or tub with a soil consisting of three parts of fine alluvial loam and one part leaf-mould. It is propagated easily by layers ; but with the aid of fine sand and bell glasses cuttings may be struck easily. Very fine plants of this are planted near the front wall of the College of Science, Poona, which faces north 18° east. The soil is rich loam overlaying the usual *débris* of a building.

COMBRETIUM GRANDIFLORUM.

Except in the larger size of all its parts and its greater hardiness, it is difficult to point out any characteristics in which this diffiers from *Combretum coccinea.* It thrives and looks well if cut back and kept in a shrubby form as a single specimen on a lawn. If permitted to run up the walls of a house its flowers are produced almost out of sight. Propagated by layering without difficulty.

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[*] *Quisqualis*, from *quis*, who, and *qualis*, of what kind—a natural exclamation on finding a strange plant.

[†] *Indica*, from India.

[‡] *Poivrea*, after Poivre, a French traveller.

[§] *Coccinea*, red-coloured.

TERMINALIA[*] CATAPPA,[†] *Bengalee Badam.*

This very handsome tree bears a fruit which resembles almonds, and as the latter fruit is also called badam, much confusion arises. *Terminalia catappa* is valued for its shade and landscape effects, but its fruit is acknowledged to be inferior to the almond.

MYRTACEÆ,[‡]

The Myrtle Family.

This family is represented in our gardens by the sweet-scented myrtle, jambool, rose-apple, and guava trees, and is easily recognized by the presence of translucent dots and a vein running round parallel with the margin of the leaf connecting all other veins. Any ordinary garden soil kept moist is suitable for growing the members of this family. Propagation is effected by cuttings and seeds. The seed must in all cases be quite fresh; in the myrtle and jambool it will germinate well if sown directly it is gathered from the tree—a condition which is rather exceptional.

MYRTUS COMMUNIS,[§] *The Myrtle.*

Is a sweet-scented shrub, indispensable in gardens. A deep well-drained soil and regular watering are the most favourable conditions for its growth; propagate by cuttings or seeds. Besides the typical myrtle, a large-leaved and a small-leaved variety are in cultivation—the large-leaved variety is particularly fine.

SYZIGIUM JAMOLANUM, *Jambool, Nasedoo,*

Is a large tree thriving well in deep soil with plenty of water available. Seedling plants afford a large quantity of indifferent fruit; but the finest sorts, which may be procured by grafting from select trees, are well worth cultivating on the banks of rivers and such positions where water is within reach, as the trees need very little attention.

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[*] *Terminalia*, in allusion to the leaves growing at the ends of the branches.

[†] *Catappa*, from the Malayan vernacular name.

[‡] *Myrtaceæ*, from the genus *myrtus*, from *myron*, perfume.

[§] *Communis*, common.

PSIDIUM[*] GUYAVA,[†] *Guava*, *Jam*, *Peyer*, *Peyeroo*,

Requires a deep sandy loam soil, and a free supply of water and manure after the fruit is set. The trees in cultition are generally seedlings, but grafted plants are easy to procure; and as a grafted plant bearing fruit of a high quality costs no more for water, manure, and soil than a common seedling, the grafted trees are much to be preferred, although a little more costly at first. Layering, as described at page 68, may be used to propagate superior varieties of the Guava.

Guava trees are usually planted in lines ten feet apart and the intervening space cultivated with vegetable crops needing irrigation until the trees cover the soil. Districts having a dry climate are well adapted for its growth.

The cultivation of this popular fruit is an important industry, and it appears that little has been done for its improvemet. As the trees in cultivation are chiefly seedlings, there is an immense variety in the quality of the fruit. There is a good opportunity for really valuable work by our Horticultural Societies on this tree. If an offer of Rs. 50 or Rs. 100 was given for a really fine sample of guavas, on condition that the tree from which the fruit was gathered should be available for grafting by the Society, it would doubtless be found, and something more useful than stunted palms in pots or ferns achieved. Grafting the guava is an operation that can be taught to an intelligent coolie in half an hour—a desirable system is detailed at page 65. An idea prevails among some classes that this tree can be caused to bear seedless fruit by removing the pith of the tree while young, but it has no foundation. Imperfection of the sexual organs in the flower only can bring about the absence of seed.

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[*] *Psidium*, from *psiv*, a crumb, in allusion to the crumb-like seeds.

[†] *Guyava*, from the West Indian name.

PSIDIUM GUYAVA VARIEGATA

Is an ornamental variety cultivated in Calcutta gardens.

PSIDIUM PUMILUM, called by malees *Chin-ka-jam.*

A small shrub looking like a guava tree in miniature. It is grown in gardens as a curiosity.

EUGENIA MALACCAENSIS, *Malay-ka-Jam.*

A small tree thriving specially in Bombay gardens and having shortly petioled, ovate, lanceolate, smooth leathery leaves 9 to 12 by 3½ inches and dense racemes of shortly stalked bright crimson flowers having 4 sub or bicular glandular petals and numerous stamens. It is propagated by seed.

EUGENIA JAMBOOS, *Goolab Jamb, The Rose-Apple.*

A small tree with opposite lanceolate short-stalked leaves and large flowers having an immense number of long white stamens followed by a sub-globular berry of rich pink and white colours, but an indifferent flavour.

This tree is of slow growth and propagated by fresh seed.

BERTHOLLETIA* EXCELSA,† *Brazil Nut.*

This seed is abundant in the principal oilman's store shops about Christmas, but few people have succeeded in getting it to germinate. Mr. Nichols of Jaunpore has lately presented plants to the Agri-Horticultural Society of India. In a climate like that of Kanara there is much probability of its growing well. To get the seed to germinate it should be ground on a stone until the shell is thin and then planted.

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* ***Bertholletia,*** in honour of Louis Claude Berthollet, a celebrated French chemist.

† ***Excelsa,*** high.

MELALEUCA[*] STRIATA.[†]

At Poona this occurs as a stiff erect shrub with thick leathery, linear, pointed, alternate sessile leaves and spikes of bright crimson crowded flowers resembling a bottle brush with their numerous stamens. It is of extremely slow growth, but in fair loamy soil remains healthy, flowers freely and needs little attention.

It may be propagated by cuttings.

MELASTOMACEÆ.[‡]

MELASTOMA MALABATHRICUM.[§]

It is remarkable that this shrub is rarely met with in Indian gardens, although it has large, showy, purple flowers and grows freely in jungles that have not an extreme climate. In Flora of British India it is said to be found "throughout India, very abundant," but that statement needs qualification. It is possible to travel many hundreds of miles in India without meeting with it. On the eastern side of the Western Ghauts it is abundant about the latitude of Vingorla, but a few degrees north it is not to be seen. The seed does not germinate freely or bear transplanting, but if sown on a raised bed consisting of one-half stones and one-half earth watered freely during the rainy season and protected from hot winds it will, no doubt, repay the trouble. Its flowers are bright purple about 2 inches in expansion and produced in copious terminal panicles.

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[*] *Melaleuca*, from *melas*, black, and *leukos*, white—the trunk of some species is black and the branches white.

[†] *Striata*, striped.

[‡] *Melastomaceæ*, from the genus *melostoma—melas*, black, and *stoma*, a mouth, because the fruit of some species blackens the mouth.

[§] *Malabathricum*, from Malabar.

LYTHRARIEÆ,*

The Mindie Family,

Includes a few trees and shrubs of great beauty, thriving without special care and easily propagated by seeds or cuttings.

LAGERSTRŒMIA† INDICA,‡ *The China Mindie.*

A very beautiful shrub, bearing flowers of every shade, from pale rose to dark crimson, and flowering early in the rainy season. Any good soil with regular watering is suitable. Propagate by cuttings or seeds.

LAGERSTRŒMIA REGINA,§ *Jarool Tamam, Moota bhandara.*

A very handsome tree, thriving in the Concan and other moist districts, casting its leaves in the hot season and flowering during the rainy season. Propagate by seeds.

It has opposite, broadly eliptic, obtuse leaves 4 to 9 inches in length and large panicles of showy lilac flowers 2½ inches in diameter.

LAGERSTRŒMIA PARVIFLORA|| *Nanch, Daura, Sida, Lendi.*

An attractive tree from the immense number of its small white fragrant flowers produced at the beginning of the rainy season. The leaves are 2 to 3½ inches, oblong, leathery, with very short, if any, stalks, and of a greyish green colour.

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* *Lythrarieæ*, from the genus *Lythrum*, from *lythron*, blood—it is said from the colour of the flowers.

† *Lagerstræmia*, in honour of Lagerstræm, of Gottenberg.

‡ *Indica*, of India.

§ *Regina*, the queen

|| *Parviflora*, small flowered.

LAWSONIA[*] ALBA,[†] *The Henna Plant, Mendee, Erkan, Gounta.*

Mendee is a hardy shrub, well suited for internal fencing. Propagate by seeds or cuttings.

In a rich soil it may be cut down once a year with advantage as it attains 5 feet in height and bears its small white strongly perfumed flowers at the end of the rainy season. The prunings are worth about Rs. 5 per cartload if near a large city, for the preparation of henna.

PUNICA[‡] GRANATUM,[§] *Pomegranate, Dalim, Anar,*

Enjoys a deep calcareous soil and thrives with less water than is required for the other members of this family. The tree is usually raised from seed, but select varieties can be propagated easily by enarching.

Pomegranate trees may be planted 8 feet apart and the ground cultivated with irrigated crops until the trees occupy the soil. Because pomegranate trees will live and bear some fruit with little attention, they are very often permitted to do so, while a good return for extra care may be relied on in the dry districts as well from this as any other fruit. A tree that bears fruit of good flavour with as few seeds as possible should be grafted on seedlings and none but the grafted plants grown. Such trees need no more manure, water, or land than common seedlings, yet the value of their fruit is very great in comparison. A caterpillar infests the fruit, causing immense loss; the only prevention of it is to gather every fruit that is infested even to a slight degree and burn them. If the cultivators of a district will unite to do this, for several years the stock of that particular insect will greatly be reduced and fair crops during some years may repay the trouble.

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[*] *Lawsonia,* after Dr. Lawson, who published a "Voyage to Carolina" in 1709.

[†] *Alba,* white.

[‡] *Punica,* from *punicus,* Carthagenian

[§] *Granatum,* having seeds or kernels.

ONAGRACEÆ,[*] *The Fuchsia Family.*

This family includes the Evening Primrose (*Œnothera*[†] *Drummondii*), a trailing plant bearing large bright golden flowers open in the evening, which thrives in any fair garden soil, and is propagated by seeds, and the Fuchsia, which thrives well on our hills. By bringing well established plants from the hills, the plants can be got to bloom freely for a year or so in the Deccan, but they gradually weaken. Also,

JUSSIÆA [‡] SUFFRUTICOSA.[§]

An erect herbaceous plant which thrives on the margin of a pond and is very showy during the cold season with very numerous bright yellow flowers of 4 petals about ¾ inch in expansion and with alternate lanceolate leaves.

TRAPA [‖] BISPINOSA,[¶] *Singara, Pancephal.*

The well known singara nut or water chestnut with two spines grows freely in tanks having a muddy bottom and is very profitable when near a market. It requires no special culture and may be propagated by fresh seed or plants.

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[*] *Onagraceæ*, from *onagra*, an old name for the genus *œnothera.*

[†] *Œnothera*, from *oinos*, wine, and *anthera*, a hunt or eager pursuit—an old Greek name given by Theophrastus to some plants the roots of which were eaten to provoke a thirst for wine.

[‡] *Jussiœa*, in honour of a celebrated botanical family.

[§] *Suffruticosa*, from *sub*, under, and *frutex*, a shrub—a less woody plant than a shrub.

[‖] *Trapa*, abridged from *calcitrapa*, an instrument with spines, used to impede cavalry by injuring the horses' feet.

[¶] *Bispinosa*, having two spines

ŒNOTHERA ROSEA.*

A very pretty little plant from Mexico, 1 foot in height, with pink flowers of 4 obvate petals, has establised itself in many gardens in this country, especially at Mahableshwar.

PASSIFLOREÆ.†

A group of plants chiefly of South American origin and well known in Indian gardens by the *papay*, *Carica papaya*, and the beautiful climbing plants known as Passion flower. For the cultivation of all this group a rich open soil containing abundant lime and a liberal supply of water is desirable and a retentive black soil should be avoided. Propagation of the papay is generally by seed ; the other members of the family are easily increased by cuttings and layers.

PASSIFLORA EDULIS.‡

This is one of the most beautiful climbers in cultivation. If planted at the foot of a wall with an aspect not hotter than south-east and the light, open, limey soil noted above, its large three-lobed shining leaves and bluish purple star-like flowers with two whorls of filamentous processes radiating from the centre and a sweet cherry-like perfume and (on the hills) ovoid plum-like yellow fruit containing a refreshing juice render it a very attractive fruit. At 2,000 feet altitude in latitude 18°N. it flowers very freely throughout the rainy season, but rarely fruits ; at 4,000 it flowers and bears fruit abundantly. This species may be distinguished from other Passion flowers by two glands on the petiole near the base of the leaf and glandular serratures on the three bracts at the base of the flower.

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* *Rosea*, rose coloured.

† *Passifloreæ*, from the genus *passiflòra*, from *patior*, to suffer, and *flos*, a flower. Given by the Jesuits from a resemblance to the passion of our Lord.

‡ *Edulis*, edible

PASSIFLORA LAURIFOLIA.[*]

With entire oblong leaves and large blue sweet-scented flowers, thrives with the treatment given above. In the West Indies this plant is valued for its fruit.

PASSIFLORA RADIANA, often called *Passiflora kermesina*,

Has three-lobed leaves and bright red flowers produced in great abundance, one in the axil of each leaf, on long slender branches which hang gracefully when grown over an arch or on a tree. This species may be distinguished by glands on the petiole at irregular distances apart. It enjoys the coolest exposure attainable in the plains of India or slight shade.

PASSIFLORA RACEMOSA[†]

Has deep red or scarlet flowers two in each axil, and usually four glands on the petiole of each leaf, and resembles the last species in thriving with a very cool exposure or slight shade.

PASSIFLORA HOLOSERICEA[‡]

Has soft downy leaves and flowers about 2 inches wide, spotted with red, purple, and white, and produced in great numbers during the cold season.

PASSIFLORA FŒTIDA,[§]

A small white passion-flower having soft hairy leaves, a fœtid smell, and the bracts at the base of the fruit very much divided, giving the fruit a pleasing mossy appearance. Useful in table decoration. This species has become a weed in Deccan gardens.

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[*] *Laurifolia*, having leaves like the laurel.

[†] *Racemosa*, having long flowering branches, each flower being stalked.

[‡] *Holosericea*, all over silky.

[§] *Fœtida*, having a disagreeable smell.

TACSONIA[*] INSIGNIS.[†]

Closely resembles the Passion-flowers in habit and culture, except that it will not bear the heat of the plains. Between an altitude of 4,000 to 7,000 feet it thrives and blooms freely in autumn. The plant may be distinguished from others nearly allied by its violet crimson sepals with a green keel on the outside, prolonged downwards into a spur one inch long.

PASSIFLORA MURUCUIA.[‡]

The bat-winged Passion-flower, often called *Murucuja ocellata*, is a useful plant for covering a conservatory wall. Its remarkable spreading lobed leaves form a neat covering, but in the plains it rarely flowers.

CARICA[§] PAPAYA,[‖] *The Papaw.*

This well known tree has been subjected to ill merited abuse, described as ugly and everything that is disagreeable, yet it may be questioned if there is a more handsome or generally useful tree in Indian gardens. If planted in a suitable position its tall straight stem crowned by a grand tiara of large palmate leaves gracefully disposed on long stalks, the sweet perfume of the pendulous male flower or the fruit borne by the female trees, useful in a green state as a cosmetic and when ripe a fair substitute for apples in a pie, surely are enough good qualities to deserve attention.

A loose very rich soil with abundant lime and regular irrigation is desirable. The seed may be sown any time during the rains, a few seeds being put into holes 5 feet apart. If for ornamental purposes, the centre of a large group of shrubs is a suitable position—in this case the male tree should be preferred, as it produces numerous sweet-smelling flowers carried on long pendulous stalks. The first flowers appear when the plant is a few feet high, and a selection should be made at this time. If the plant is cultivated for fruit, one male to one hundred female trees is sufficient. The female flower is longer than the male, has a very short stalk, and may be recognised by the globular ovary in the centre.

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[*] *Tacsonia*, from *tacso*, the Peruvian name of one of the species.

[†] *Insignis*, remarkable.

[‡] *Murucuia*, an American vernacular name.

[§] *Carica*, from Caria, erroneously supposed to be its native country.

[‖] *Papaya*, from its vernacular name.

This plant is largely grown at Poona and Bhownagar as follows. The ground is thoroughly ploughed and heavily manured during the hot season or beginning of the rainy season and prepared for irrigation. In July or August brinjal seed is planted with lines of papay five feet apart, a few seeds being put into holes three feet apart in the lines. Thinning is regularly attended to. The brinjal crop is cleared off during the autumn, and about the same time the first flowers of the papaw appear and declare the sex of the trees. As soon as this is determined, the male trees are mostly pulled up, a few being retained in corners to fertilise the flowers retained for seed. Fruit intended for the market does not need fertilization because the fewer seeds that are produced the better. The edible part is, if anything, improved by the want of seed.

The popular reputation of this fruit is given in the Pharmacopœia of India thus: " A belief in their powerful emmenagogue properties [promoting the monthly discharge] prevails among all classes of women in Southern India; so much so, that they assert that if a pregnant woman partake of them, even in moderate quantities, abortion will be the probable result."

CUCURBITACEÆ.*

The Gourd Tribe.

A family of climbing plants of great importance, from the numerous esculent fruits it affords (melon, cucumber, and others), and from a few important medicines (colocynth and elaterium). These plants have the sexes in separate flowers, and in many cases all the flowers of a particular plant are of one sex only.

The cultivated members of this family are of very rapid growth, and in consequence require rich soil and abundant water; old, well decayed manure in large quantities is of much importance. Propagation generally is effected by seed only, but the stem strikes root freely, and cuttings may be used to propagate a few of the species, which live several years.

The value of hereditary influence in this family is remarkable. To grow melons and cucumbers of fine quality from seed grown in the country is easy, but to grow the varieties of those vegetables that are common in Europe and America needs great care. Those varieties appear to be more delicate to need a subdued light and to be more subject to insect attacks than the country varieties. Raised banks of very rich friable soil with means of watering abundantly and the cloudy sky of the rainy season is the most suitable for growing exotic varieties, but unfortunately at that season few people care to eat this class of fruit.

CUCUMIS † MELO, *The Melon, Kurboos.*

Of the many varieties of melons that are grown in this country, the best suffer greatly from any excessive moisture in the atmosphere, yet they enjoy a very large quantity of water at the root. Any rich friable loamy soil is suitable. It should be laid up in large ridges, between which the seed should be sown and the plants trained over the ridges so as to be perfectly secure from excess of moisture. The seed may be sown any time from September to December. When the plants have grown about a foot, the point of the shoot should be taken off, so that several other shoots may branch out; the points of these should also be taken off until there are about a dozen branches. These may be permitted to remain until one or two fruits have formed on each branch, then the point should be taken from the branches, and any fresh shoots that appear should be pinched out. Water should be given freely once in two days until the fruit is nearly ripe, when it should be discontinued. The melon, like others of its tribe—the cucumber, pumpkin, &c.—has the male and female organs in separate flowers and sometimes they are on separate plants. The varieties of melon grown in India are very numerous, and description of them would occupy more space than can be spared, but the *chitla* of Lucknow may be noted because Bonavia says it is rapidly deteriorating and needs the attention of all good cultivators to restore the high character the fruit formerly possessed. Externally it is lemon yellow, spotted with green or orange yellow, and internally greenish white, sweet, and of a nice soft texture; very delicious and only grown satisfactorily at Alumbagh, Lucknow.

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* *Cucurbitaceæ,* from the genus *cucurbita,* a gourd.

† *Cucumis,* a cucumber, *melo,* a melon.

SIGNS OF RIPENESS IN MELONS

Vary with the variety, but generally the rich perfume and the soft feel are sufficient indications; but some are overripe before these symptoms appear. In such cases the cracked foot stalk or a soft ring near to the stalk are the indications of value. It is amusing to watch a fruit dealer selling melons.

There are two systems: in one the buyer chooses the fruit and takes the risk of its being unripe, and in the other for an extra price the seller guarantees the fruit to be ripe. In the latter case he selects a fruit from his store and ostentatiously taps it with his finger nail all over, quietly testing it at the ring near the stalk in the midst of his humbug, then taking up his knife he boldly cuts out a bit and displays the colour and perfume peculiar to a ripe fruit of the particular variety.

CUCURBITA MAXIMA, *Gourd*, *Bopala*.

Growing monster gourds is a very interesting and profitable amusement, and as large a fruit may be grown within the limits of a soldier's garden as in any other. Procure several cartloads of well rotted horse litter; if it is dry and hot, water it well, and lay it up in a heap to ferment; water the heap slightly daily, and at the end of a week, turn it over and water well again; continue watering and turning weekly for six weeks, by this time the heap will be greatly reduced in size, and should be quite cool and moist; dig the ground thoroughly a foot deep several times over in the meanwhile, and when the manure is ready, spread it on six inches thick and dig it in. About the middle of the rainy season plant several seeds in patches a few feet apart and water daily, but slightly at first. As the plants begin to grow fast, water more plentifully, but only every alternate day. Flowers will soon appear—pick off a few of the first to allow the plant to gain strength. In all the gourd tribe the male and female organs are in separate flowers, and it very often occurs that the flowers are all one sex on the same plant. By examining the flowers carefully it will be seen that some of them yield a quantity of fine yellow powder in the centre. These are male flowers, and this yellow powder, called pollen, must be carried to the female flowers before fertilisation can take place.

Very often insects perform this duty; but if no fruit is appearing, it must be done by hand. The female flowers are generally much more numerous than the male, and may be distinguished by the absence of the pollen. Procure a camel-hair pencil and apply it gently to the centre of the male flower; the pollen will adhere to the hairs; carry this to the female flowers and apply it gently all over the little knob in the centre of the flower. When the fruit begins to form pick off all other flowers that appear and the ends of the shoots. If any shoots appear nearer the root than the fruit is, cut them off entirely. Place some clean dry hay underneath the fruit and a shade over it to keep off the sunshine. By the time the plant withers up, the fruit should be a heavy load for a man. If kept for a month or so, before cooking it resembles in appearance and taste the Swedish turnip.

CUCUMIS SATIVUS,* *The Cucumber*, *Khira*, *Kakri.*

We are fortunate in India in having this vegetable, which is easy to cultivate, and by using the local varieties adapted to the seasons can be had in perfection during eight months of the year in districts where the rainfall does not exceed 40 inches annually. Any rich garden soil is suitable. During the dry season arrange for irrigation and during the rainy season sow on raised banks, so that there may be no stagnant water. If a few seeds are put in once in 15 days from April till November a steady supply may be expected.

CUCUMIS MADRASPATENSIS,† *Mokia.*

A small egg-shaped gourd, averaging 1½ by ¾ inch, used in pickling, is brought to market in considerable quantities in the Deccan during the three latter months of the year. It is not much cultivated, being abundant in hilly districts.

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* *Sativus*, cultivated.

† *Madraspatensis*, from Madras.

TRICHOSANTHES[*] ANGUINA,[†] *Padol, Chiconda, Chachinda, The Snake-gourd.*

A gourd attaining three feet in length with a thickness of three inches. Is cultivated as a rainy season crop, with an arrangement for training the plant on as described under DILPASAND.

TRICHOSANTHES PALMATA,[‡] *Mukal, Koundal.*

A gourd of a bright red colour and the size of an orange, borne by a perennial climber with palmate leaves, common on the Western Ghauts. The flowers are slightly fœtid, of a pale yellow colour, and extremely variable in form, some having long fringes to the petals and others having none, and interesting from the remarkably dark orange-red colour of the pollen which bees collect with avidity.

It thrives in Deccan gardens without special care.

BENICASIA[§] CERIFERA,[||] *Petha, Kumhra, Pandree Chickee.*

A cheap gourd much used in pickle and in the manufacture of sweetmeats. It averages 5 lbs. in weight, is oval or globular, regular in outline, has short stiff hairs, and is covered with a whitish bloom. Grown during the rainy season on a trellis as described under DILPASAND.

LAGENARIA[¶] VULGARIS,[**] *Dhudia, Kaddu, Lauki.*

This fine gourd is of easy culture and remains in season a long time. It may be sown at intervals of a month from

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[*] *Trichosanthes, trix trichos,* a hair, and *anthos,* a flower, in allusion to the long hairs of the corolla.

[†] *Anguina,* snake-like.

[‡] *Palmata,* palm-shaped, referring to the leaves.

[§] *Benicasia,* in memory of the Italian nobleman of that name.

[||] *Cerifera,* wax-bearing.

[¶] *Lagenaria,* from *lagena,* a bottle.

[**] *Vulgaris,* common.

February till August on a sandy soil heavily manured and watered, the seeds being planted in patches 6 feet apart, the creeping stems soon cover the ground. Ripe fruit of this sort 20 lbs. in weight are common; for the table it should be cut very young and cooked with milk sauce.

CITRULLUS* VULGARIS,† *The Water-melon, Kalinda, Tarbooza.*

Some writers try to deprecate this fruit, but it is evident they have not enjoyed a ripe one that has been brought in at early morn, kept in a cool place, and eaten with sugar at midday with the wind at 106° Fahr. Then the water-melon *is* a melon. Its cultivation is most successful in the gravelly beds of rivers where the roots can easily reach water. Abundance of the richest manure must be used and the seed sown in January-February. A variety of this gourd is grown in hilly districts by sowing at the end of the rains; it is in season from December till February, but is not greatly valued.

CITRULLUS VULGARIS FISTULOSUS,‡ *Dilpasand, Trindus, Tinda, Tensi.*

A globular smooth gourd sometimes with slight vertical ridges and when ripe of a pale yellow colour without markings. The average weight is 10 oz. This variety is cultivated generally in Gujerat and Sind, but is not common in other districts. It is sown in the hot season in structures resembling the betel houses of Central India, but having less shade and is in season until the rainy season is well advanced.

This structure is built by firmly inserting posts about 5 feet in length in rows about the same distance apart and with nearly the same length between the posts. To the tops of the posts transverse rods are fastened, and the climbing gourds are trained to the uprights and across the transverse rods until the whole is covered by a leafy screen and the fruit hangs down beneath. The whole arrangement is distinctly temporary, but the effect is very pleasing. The foliage above, the gourds and legumes of many shapes and colours suspended from the roof, and the moist sandy soil beneath combine to form a place where one is tempted to linger during the fierce heat of a Guzerat summer noon. The seed is black, ovoid in outline, and has a ridge following the outline of the seed. This vegetable is very delicious when properly cooked.

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* *Citrullus*, from *citrus*, in allusion to the orange-like fruit.

† *Vulgaris*, common.

‡ *Fistulosus*, like a pipe, having a hollow stem.

CITRULLUS COLOCYNTHIS,* *The Colocynth Plant, Indrayan, Kuroo Indrayan.*

This valuable medicinal plant is abundant on the loose sandy tracts of the coast of Guzerat and in some parts of the Deccan on a loose open dry soil; and if sewn on newly formed railway embankments it yields heavy crops and helps to protect the embankments from wasting away by heavy rainfall, owing to its long spreading stems lying close to the ground. In ordinary soil its cultivation is rarely successful, but on loose soil thrown out of conservancy pits good crops may be grown by sowing about the middle of the rainy season.

To prepare the drug arrange some sheets of iron or smooth stones on the ground, pare and quarter the fruit, and spread it out on the smooth dry surface; then cover it with iron sheets, keeping them slightly more raised at one end than at the other and inclined towards the south. By this means it will dry to the clean white spongy pulp which druggists ask a high price for.

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* *Colocynthis*, from *Kolokunthis*, the bitter gourd.

MOMORDICA[*] CHARANTIA, *Karali, Karola.*

An oblong yellow gourd covered with smooth tubercles and having the seed immersed in red pulp. This gourd is bitter, but appears to be much used in cookery. There are rainy and hot season varieties.

LUFFA[†] ÆGYPTICA, *Ghiya, Taroi,*

An oblong fruit thickening at the lower end and without ridges, and

LUFFA ACUTANGULA,[‡] *Turoi, Taroi, Katitaroi,*

An oblong fruit thickening at the lower end and having 10 acute ridges, are both delightful vegetables when properly cooked and are in season during three to four months at the end of the rainy season.

CUCURBITA PEPO[§] OVIFERA,[‖] *Vegetable Marrow.*

This gourd is of easy culture in the Deccan during the rainy season and in southern districts having a heavy rainfall during the cold season, but is not extensively grown because the indigenous *dhudia* serves nearly the same purpose. From the middle to the end of the rainy season, according as the rainfall is light or heavy, is the best sowing time, and a sandy soil with abundant manure and heavy watering is desirable.

BRYONIA[¶] LACINIOSA,[**] *Nehoemeka, Gargoo naroo.*

A very ornamental small gourd produced in great abundance at the end of the rainy season when long vines bearing clusters of 2 or 3 globular fruits, ¾ inch diameter, of bright red colour with white spots. When the fruit is ripe the leaves are usually dried up and need to be removed for ornamental purposes. A deep alluvial soil and 30 inches of rainfall suit this plant well. Sowing should be made at the beginning of the rainy season.

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[*] *Momordica*, from *mordes*, to bite, the fruit appears bitten.

[†] *Luffa*, the Arabic name of one of the species. *Ægyptica* from Egypt.

[‡] *Acutangula*, having sharp ridges.

[§] *Pepo*, a large gourd, a pumpkin.

[‖] *Ovifera*, egg-bearing, from the appearance of the fruit.

[¶] *Bryonia*, from *bryo*, to sprout out, in allusion to the rapid growth.

[**] *Laciniosa*, having tassel-like appendages.

CEPHALANDRA[*] INDICA,[†] *Vimba, Tela Boocha, Kaydonda.*

A useful climber ornamental on a rocky bank. It has a perennial rootstock, scabrid stems 3 inches diameter. Diœcious white flowers and oblong bright scarlet edible fruit 2 inches in length. Any ordinary garden soil and natural watering suit it.

UMBELLIFERÆ.[‡]

The Carrot and Coriander Family.

A very large and important family, easily distinguished by its umbrella-like inflorescence, consisting of many rays spreading from one point and bearing very small white or yellow flowers, the Umbel. Among garden examples, the carrot, celery, and parsley are common, and the aromatic seeds, coriander *(Coriandrum sativum)*, dill *(Anethum graveolens)* are well known. The members of this order thrive in deep gravelly rich soil with a free supply of water during the growing season. Except in rare instances propagation is by seed only.

DAUCUS[§] CAROTA, *The Carrot, Gajir.*

The carrot may be grown in the Deccan and like districts, where the rainfall is not over 25 inches annually during the rainy season as a culinary vegetable ; but the best flavoured roots are procured from sowings made during the cold season. It is better to have the ground for carrots manured the year previous and well turned up some time before sowing. The seed should be sown in lines eight inches apart, and the young plants thinned out about two inches apart. During the rains occasional slight watering is required if the weather prove dry ; but during the cold season, water should be given once a week.

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[*] *Cephalandra*, referring to the stamens forming heads.

[†] *Indica*, of India.

[‡] *Umbellifera*, from *umbello*, a sunshade, and *fero*, I bear, from the form of the inflorescence.

[§] *Daucus*, from *daukon*, Greek, a kind of wild carrot; *carota*, a carrot.

Large sowings for forage should be made in October and November, and if late rains are favourable good crops may be grown in the Deccan on a deep retentive soil without irrigation. At Poona the price is sometimes as low as Rs. 8 per ton in January.

The Deccanee carrot is a root of good flavour, but small and very uncultivated looking, averaging 5 inches in length and 2½ inches in thickness at the top, suddenly reducing to the point and buried to the crown. The seed is comparatively large and the leaves much less divided than Early Horn and other garden sorts.

Of culinary varieties the following is a useful selection of carrots :—Early Scarlet, Dutch Horn, English Horn, Half Long Blunt Scarlet, and Altringham.

APIUM* GRAVEOLENS, *Celery.*

The leaf stalks of this plant being the edible portion, it should be grown rapidly, so that the fibre may not be developed and the light shut out to make the stalks white or red, according to the variety. In its natural condition the plant has hollow leaf stalks, but carefully selected seed gives solid stalks having little fibre. The original plant is found wild in ditches in some parts of England and at the base of North-West Himalayas. It is easily cultivated in this country and very fine stalks can be grown; but it is very rarely to be seen in the markets in a condition fit for the table. A well-drained soil is of the first importance. It should be dug 18 inches deep, and a heavy coating of manure turned in. If the soil is of a thoroughly good draining quality, trenches should be dug 12 inches deep, the same wide, and manure dug in at the bottom of the trenches.

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* ***Apium***, said to be from a Celtic word for water, referring to the natural habitat of the plant.

The seed may be sown between July and November—the earlier time for districts having light rainfall and the latter for heavy rainfall—in lines six inches apart, on a bed of rich friable soil, and when grown about four inches the seedlings should be transplanted into the bottom of the trenches. The young plants should be watered gently at first; but after the plants have begun to grow, water freely every three days, adding liquid manure at every alternate watering.

When the plants have grown about 18 inches high, fill up the trenches with soil as high as the base of the leaves; this will form trenches between the rows and then the water should be turned into them. The object of filling up these trenches with soil is to blanch the leaf stalks to render them white and crisp.

If the situation is subject to a heavy rainfall or the soil retentive, it is better to dispense with trenches and put the young plants in beds, using drain pipes and straw to effect the blanching process. The essential part is to keep out the light.

PETROSELINUM SATIVUM, *Parsley*.

This fine-flavoured herb can be grown to perfection in a great part of India; it requires a free sandy soil, and watering once a week when established.

If the rainfall is over 50 inches annually, the beds should be raised so that the water may run off freely.

CELERIAC, *or Turnip-rooted Celery*,

Is a variety specially adapted for flavouring, but is not required in this country because in a plantation of the typical sort, many plants are to be found that are not fit for any other purpose.

HYDROCOTYLE* ASIATICA, *Bhrumhee*, *Thul-kura*, *Codagen*.

A pretty little plant creeping on the surface where the soil is moist and slightly shaded and bearing orbicular or kidney-shaped crenate or entire leaves 1½ to 2½ inches in longest diameter and obscure flowers in groups of 3 to 6. Care must be taken to distinguish this plant from the rat's-ear creeper, *Ipomœa reniformis* (*undir-kanee*), which is abundant on black soils in open dry places: they resemble each other much, but the *Ipomœa* has milky juice and very small yellow flowers not easily observed. The medicinal virtues of *brumhee* are given in the Pharmacopœia of India as "useful in constitutional syphilis, in non-specific ulcerations, and in skin diseases; it is valuable both as an internal and a local remedy." The preparations of the drug are "a powder of the leaves dried in shade and kept in stoppered bottles and a poultice of the fresh leaves bruised."

HYDROCOTYLE ROTUNDIFOLIA,† *Hydrocotyle nitidula.*

Pretty little creeping plants of dense growth and covering the surface of flower pots that are regularly watered with a fresh green mantle. It is not beneficial to the principal subject in the pot, because it prevents the stirring of the soil that is necessary for the healthy growth of many plants, but when grown in small shallow pots by itself it is very charming. Regular and frequent slight watering and shade from direct noonday sunshine are the conditions it enjoys. Propagation is effected by division.

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* *Hydrocotyle*, *hydor*, water, and *kotyle*, a vessel, in allusion to the form of the leaves of some species. *Asiatica*, from Asia.

† *Rotundifolia*, having round leaves. *Nitidula*, from nitidus, shining.

PASTINACA* SATIVA, *Parsnip.*

This root can be grown easily in districts where the rainfall does not exceed 30 inches as occurs in the Deccan, by sowing in deeply worked rich soil in July-August, and irrigating when the surface becomes dry. Transplanting is apt to make the root forked and injure it for culinary purposes.

CORIANDRUM† SATIVUM, *Coriander. The seed, dhunya; the herb, khotmir.*

An herb in very general use among the people of India and easily grown in districts having slight rainfall from July to March; in other districts during the early part of the cold season it is abundant. The fruit, which is in English called coriander seed, is a widely known condiment.

FŒNICULUM‡ VULGARE, *Common Fennel, Panmuohri, Burra-sof,*

CUMINUM§ CYMINUM, *Cummin seed, Jira,*

PEUCEDANUM‖ GRAVEOLENS,¶ *Dill seed, Sowa,*

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* *Pastinaca*, from *pastinum*, a kind of dibble, in reference to the form of the root. *Sativa*, sown or planted.

† *Coriandrum*, from *koris*, a bug, in allusion to the smell of the herb.

‡ *Fœniculum*, the Latin name of the fennel plant; *vulgare*, common.

§ *Cuminum*, *cyminum*, the Latin and Greek forms of the name of the cumin seed plant.

‖ *Peucedanum*, from *peuce*, a pine tree, and *danos*, a gift, on account of the resinous substance which exudes from some species.

¶ *Graveolens*, heavy smelling.

CARUM* COPTICUM, ***Owa, Ajwain,*** **and**

CARUM ROXBURGHIANUM,† ***Ujmud, Chanoo, Rhadooni,***

May be grown on sandy soil with irrigation if sown at the end of the rainy season.

BEGONIACEÆ,‡

The Begonia Family,

Is a small group of very beautiful herbaceous plants, which thrive well in the Deccan in a coir-matting or grass conservatory.

There are now two distinct classes, one distinguished by brilliant flowers, having tuberous roots, which require a distinct season of rest, and the other distinguished by handsome foliage, which must be kept growing slowly during the dry season.

The tuberous rooted section is raised from seed or from imported tubers. The seed is very minute, and should be sown on a mixture of well decayed leaf mould and sand previously thoroughly watered; the seed on being sown should be covered with a layer of soil not thicker than ordinary writing paper, and if water is required before the seed has germinated, it should be given by immersing the pot in water very gently. Sow in April; if good, the seed germinates quickly; as soon as the plants are fit to be handled, pick out into shallow pots, and when two inches high, give a final shift singly into larger pots. By October the plants should be gradually dried off, and when thoroughly dried, laid aside in a cool shady place till next May, when re-potting is necessary.

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* *Carum*, from Caria, where it grew. *Copticum*, referring to the Copts—Christian descendants of the ancient Egyptians.

† *Roxburghianum*, in honour of W. Roxburgh, a famous botanist who worked in India.

‡ *Begoniaceæ*, from the genus *Begonia*, named after M. Begon, a French patron of botany.

The foliage varieties are easily propagated by dividing the rhizomes or by leaf-cuttings. The centre of the leaf, with about an inch of the stalk, is the part which makes the best plant; but any place where two large veins meet will strike root if kept in a moist frame with a very sandy soil.

Soil.—A mixture of ⅓ leaf-mould, ⅓ sharp sand, and ⅓ ordinary garden soil is suitable. The climate of Poona, of which details are given in the climate tables, produces very fine 'foliage' Begonias, for the tuberous rooted section a few degrees cooler is desirable. A list of species and varieties may be found in the catalogues of the leading nurserymen.

CACTACEÆ.*

The Cactus Family.

Many of this family are highly ornamental, and should be cultivated in every garden. A soil of the richest character, consisting of decayed garden sweepings, manure, good loam, and broken bricks in equal parts suits them. The soil must be arranged so as to secure thorough drainage, as from April to November water should be given freely during dry weather; during the interval the plants should be at rest, and require no water. Slight shade greatly improves the appearance of plants of this family.

CEREUS† GRANDIFLORUS‡ and CEREUS TRIANGULARIS§

Are climbers; both are very satisfactory garden plants when treated as directed under CACTACEÆ. These are night blooming, therefore during the evening the expanding flowers should be cut off with a portion of one side of the stem and taken in doors, when the flowers may be seen in full beauty before midnight.

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* *Cactaceæ*, from *kaktos*, a name used by Theophrastus to describe a spiny plant.

† *Cereus*, from *cereus*, pliant, in reference to the shoots of some species.

‡ *Grandiflorus*, large-flowered.

§ *Triangularis*, three-cornered.

OPUNTIA[*] DILLENII,[†]

The common prickly-pear of the Salem and Coimbatore districts, is very much admired for its large clear primrose flowers when it is seen in districts where it is less common and it does not propagate itself in dry districts at an alarming rate, as *Opuntia Nigricans*, the common prickly-pear of the Deccan, does, and therefore it is preferable as a fence plant.

PHYLLOCACTUS[‡] ACKERMANNI[§] has rich crimson flowers 6 to 8 inches in diameter.

PHYLLOCACTUS CRENATUS[‖] has creamy white flowers.

PHYLLOCACTUS ANGULIGER[¶] has white petals and orange or yellow sepals.

The flowers open during the day and have a powerful fragrance. There are several other species and many hybrid forms in cultivation.

PHYLLOCACTUS HOOKERI[**]

Is a very satisfactory garden cactus with flat crenate branches about 2 feet long growing in tufts, and bearing during the early part of the rainy season white sweet-smelling flowers 6 inches in diameter, which open during the evening and close next morning. The flower may be cut during the afternoon with a small portion of the stem taken in-doors and placed in water.

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[*] *Opuntia*, the old Latin name used by Pliny, said to be derived from the city of Opus.

[†] *Dillenii*, after *Dillenius*, a famous botanist of 1687-1747.

[‡] *Phyllocactus—Phyllon*, a leaf, and *cactus*, in allusion to the leaf-like stems.

[§] *Ackermanni*, Ackermann's.

[‖] *Crenatus*, having notches.

[¶] *Anguliger*, snake-bearing, in reference to the snake-like branches.

[**] *Hookeri*, after Sir W Hooker, an eminent botanist.

To grow this cactus plant cuttings on a bank of rich soil mixed with broken bricks and water freely.

EPIPHYLLUM* TRUNCATUM.†

A small thornless cactus with short flattened branches abruptly terminated and bearing numerous very bright coloured flowers of various hues from white to crimson during the cold season. As this plant is of a trailing habit it displays its flowers better when grafted on a stock having an upright habit, such as *Pereska bleo*, or a short piece of *Cereus serpentinus* or *Cereus triangularis*. The graft is very easily effected by cutting the skin off the flat branch of *Epiphyllum* about an inch from one end and making a cleft in the stock, into which the cut portion may be inserted and fixed by a bandage aided with a piece of cork if the place is in a hollow. The newly grafted plant should be kept in a moist conservatory until union has taken place. Some grafters use the Cactus thorns to fix the scion. There are many varieties of *Epiphyllum truncatum* in cultivation, which vary in colour and size of the flowers. Among the good sorts are mentioned in Nicholson's Dictionary *bicolor*, white-edged with rose ; *Coccineum* rich deep scarlet; *Violaceum*, flowers large, pure white, with purple edges; *Roseum*, bright rose.

OPUNTIA FICUS‡ INDICA,

A nearly thornless species, which is much cultivated in Southern Europe for its fruit, an insipid egg-shaped mass of pulp, this plant has been in cultivation in various parts of India during many years, still the Government of Madras was lately advised to import it from Malta and graft it on the common prickly-pear. Fortunately the Madras Agri-Horticultural Society had sufficient influence to prevent a serious waste of Government funds on the matter. It very rarely occurs that a plant which grows freely on its own roots is improved by grafting: moreover, this plant very seldom ripens fruit in India. Dr. Voight's statement, written many years ago, that it does not fruit in Bengal, has not been contradicted. In the Deccan, with a very rich soil on a rocky bottom it flowers and forms fruit during April, but unless the rains are retarded the fruit does not ripen well.

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* *Epiphyllum*, from *Epi*, upon, and *phyllon*, a leaf. flowers appear on flattened leaf-like plant branches.

† *Truncatum*, lopped abruptly.

‡ *Ficus Indica*, Indian fig

This species has flat oval branches 18 X 9 inches, spineless or with short spines in groups of 2 or 3, the longest attaining ¼ inch. The flowers are 1½ to 2 inches in expansion, clear yellow when fresh, but soon becoming coppery, the petals are irregularly emarginate. At the flowering stage the young fruit is 2 inches in length by 1 inch at the widest part; it ultimately attains nearly twice this size and is armed, especially towards the apex, with numerous delicate spines, the longest of which attains ½ an inch.

FICOIDEÆ.*

A small group of herbs often with succulent leaves and adapted for culture in sandy soil without transplanting.

TETRAGONIA † EXSPANSA, *New Zealand Spinach.*

A creeping herb with succulent stems, small yellow solitary or twin flowers on very short pedicels and triangular succulent, obtuse, or acute leaves 2 or 3 inches in length on stalk as long as the blades, and four-angled fruit. If sown thinly near the end of the rainy season on a sandy soil freely watered with protection from cold at night in the northern districts it yields a good supply of leaves fit for use as spinach. It is propagated from seed, which it yields abundantly in the Deccan.

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* *Ficoideæ*, from *ficus*, a fig † *Tetragonia*, *tetra*, four, and *gonia* an angle, in allusion to the four angled fruit.

ARALIACEÆ,* *The Ivy Family*.

Is a small group of shrubs or climbing plants, with inconspicuous flowers the plants are cultivated for their ornamental foliage.

A compost of good loam, broken bricks, and leaf mould in equal parts, with abundant water from March to October, and in the interval a distinct season of rest. Not permitting the plants to become dust-dry, but giving water at intervals of a week or so, if the plants are growing in the ground, and if in pots enough to keep the soil barely moist—slight shade improves all the group. It is easy to engraft together several of the species, but no improvement is effected by the operation. Propagation of this group is easily effected by cuttings.

FATSIA† PAPYRIFERA,‡ *Aralia papyrifera*.

A noble-looking shrub 8 to 12 feet in height with 5 to 7 lobed alternate leaves 8 to 12 inches in width, downy while young and gracefully disposed on long petioles This fine shrub thrives on a sandy soil slightly shaded and freely watered. This shrub is interesting as the source of the Chinese product long known to artists as rice paper, the so-called "paper" being a thin slice from the pith of this plant.

It is easily propagated from the offshoots it sends up from its underground branches.

FATSIA JAPONICA§

Is a graceful shrub resembling the above in form of leaf, but smoother and more suitable for cultivation in cooler districts. It

* *Aralia* from the genus *aralia* -the meaning of this name is unknown.

† *Fatsia*, derived from the Japanese name of one of the species.

‡ *Papyrifera* producing paper § *Japonica*, from Japan.

is a favourite window plant in England and easy of propagation by cuttings of the stem.

ARALIA GUILFOYLEI.

A very useful shrub of erect habit and not given to bending towards the light when grown in a room; leaves pinnate of 5 to 9 oblong, elliptic, bluntish leaflets, sometimes lobed and irregularly spinose.

ARALIA MONSTROSA.

A *sport* or accidental variation of a branch of the above, which has occurred in many gardens. It is more dwarf in growth and the leaves are more deeply and irregularly serrate and the colour of the variegation varying in shades of greenish grey. A very showy plant when well grown.

ARALIA CHABRIERI

Is thus described by Mr. Biswas, the well known Nurseryman of Calcutta:—The leaves of this handsome plant are pinnate in shape. It is of medium growth; leaves alternate, in well developed specimens about a foot in length. The colour of the leaves is deep green with a wavy crimson at the midrib. It is a free-growing plant. On account of the elegant appearance of its foliage it must become a general favourite.

ARALIA LONGIPES.*

This ever-green plant is a native of North Australia and it is of erect-growing habit. The stems are furnished with digitate leaves, consisting of an elegant arrangement of oblanceolate acuminate leaflets which are slightly undulated at the edge. A distinct and useful addition to this ornamental genus.

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* *Longipes*, long-stalked.

ARALIA VEITCHII.*

A very graceful plant having leaves of about eleven narrow undulated leaflets which spread from the end of the slender leafstalk (digitate); the leaves are glossy green above and dark red beneath.

ARALIA VEITCHII GRACILLIMA

Has radiating leaflets about ¼ inch in width and 6 to 8 inches in length with an ivory-white central rib.

Many other varieties of *Aralia* of recent introduction are found to thrive in lattice work or grass conservatories with little special care.

The following are described by Mr. W. Bull, Chelsea, London:—

PANAX† DIFFISSUM.‡

An interesting compact-growing stove plant, a native of the South Sea Islands. It has pale bright green leaves which are triangular, bipinnate, and crispate, the primary divisions with spiny-toothed bluntish secondary divisions, the teeth turned upwards, which gives to the surface of the leaf its crispy appearance.

PANAX DISSECTUM.§

An evergreen plant of branching habit; the leaves are numerous, drooping, and bipinnate, having the obovate cuneate leaflets very greatly varied in size and outline, all of them being furnished with long marginal teeth. This plant from its plumose character and elegant habit is exceedingly pretty for table decoration and other ornamental purposes.

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* *Veitchii*, after Veitch, a well known nurseryman.

† *Panax*, from *pan*, all, and *akos*, a remedy, in allusion to the supposed medicinal properties of one of the species.

‡ *Diffisum*, twice cleft.

§ *Disectum*, twice cut.

PANAX DUMOSUM*

A remarkably neat and pleasing dwarf stove plant, with short-jointed stems, thickly clothed with deeply divided cheerful green leaves. The petioles are olive-green, mottled with brighter green, and terminating in a roundish-ovate pinnately divided blade of numerous variously-shaped lobes, the pinnæ furnished at the margins with incurved spiny teeth. Extremely ornamental.

PANAX PLUMATUM †

A very elegant plant from the South Sea Islands. The leaves form a crispy head of foliage, and are very elegantly divided. It is a plant of pleasing character, having the aspect of *Panax laciniatum*, but many degrees more finely cut.

PANAX VICTORIÆ.‡

A distinct and very graceful stove plant, thickly furnished with leaves of a remarkably elegant character, forming a recurving mass of pleasing variegated foliage. The leaf-blade is ternate, the leaflets being prettily margined with white, which gives the plant a remarkably lively and pictorial character. It is a native of the South Pacific Islands, and is one of the most elegant variegated plants of modern introduction.

PANAX COCHLEATUM,§
PANAX FRUTICOSUM,‖
PANAX NITIDUM,¶

are old garden favourites and very useful in table decoration, as the leaves retain their fine green colour for some time.

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* *Dumosum*, bushy.
† *Plumatum*, plumed.
‡ *Victoriæ*, after Queen Victoria.
§ *Cochleatum*, shell-like, the leaves resemble the oyster shell.
‖ *Fruticosum*, shrubby.
¶ *Nitidum*, neat.

HEPTAPLEURUM[*] VENULOSUM,[†] *Paratropia*[‡] *venulosa.*

A very striking shrub, with bold palmately compound leaves, having elliptic entire leaflets on long foot-stalks. It thrives with the treatment given under ARALIACEÆ if kept in the grass conservatory or the northern side of a tree.

HEDERA HELIX, *Ivy,*

A variety of this plant that has none of the beautiful green of the ivy of Europe, grows freely on the shady side of a house in the Deccan.

CORNACEÆ.[§]

A small group of trees or shrubs chiefly inhabiting temperate regions. One member,

AUCUBA[||] JAPONICA,[¶]

Is a favourite garden shrub in England, which has often been tried in India. At an altitude of 5,000 feet with protection from noonday sun it grows fairly, but at lower altitudes, where it has to compete with crotons, it is not much valued.

CAPRIFOLIACEÆ.[**]

The Honeysuckle Family.

The Indian garden members of this family are scandent shrubs with opposite sessile or connate leaves and irregular flowers in terminal groups subtended by pairs of leaves united base to base, *connate*, the stem passing between the united leaves, *perfoliate*.

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[*] *Heptapleurum—Hepta*, seven, and *pleuron*, a rib.

[†] *Venulosum*, veined.

[‡] *Paratrophia—Paratrope*, a bending, in allusion to the bent petioles.

[§] *Cornaceæ*, from the genus *cornus*, the Latin name of the cornel tree.

[||] *Aucuba*, the Japanese name of the shrub.

[¶] *Japonica*, from Japan.

[**] *Caprifoliaceæ*, from the genus *caprifolium*, goat-leaf.

LONICERA[*] SEMPERVIRENS

Has with the above characteristics dark green leaves and flowers scarlet outside and yellow within.

It is hardy and useful under ordinary garden treatment throughout the Deccan.

LONICERA LESCHENAULTII[†]

Has softly hairy branches and leaves of a pale green colour, the leaves subtending the flowers ½ to 1 inch in length and petioled. The flowers in shortened panicles, pale yellow and sweetly perfumed.

LONICERA FLEXUOSA[‡] and AUREA[§] RETICULATA.

A pretty little climber with golden coloured veins in its opposite, elliptic, ovate, acute, nearly sessile leaves, 2 × 1 inch veins: thrives nicely at an altitude of 4,000 feet, but at lower elevations loses much of its beauty.

RUBIACEÆ.[‖]

The Coffee Family.

A very important group of trees, shrubs, and herbaceous plants, including cinchona (source of quinine), ipecacuanha, coffee, madder, and other plants of economic importance, and a large number of ornamental plants. Many members of this family are hard-wooded, and ordinary cuttings strike root with difficulty. In this class layering or fresh seeds may be employed for propagating, or if shoots come from the base freely, as in some species of *Gardenia*, cuttings of underground root-like stems may be used. This is the method found successful with the ipecacuanha plant. The seeds as a rule retain the germinating power but a short time. The soft-wooded species strike root freely.

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[*] *Lonicera*, after Lonicer, a German botanist.

[†] *Leschenaultii*, after Leschenault, a French botanist who travelled in India and died at Bombay.

[‡] *Flexuosa*, bending hither and thither.

[§] *Aurea reticulata*, golden-netted.

[‖] *Rubiaceæ*, from the genus *rubia*, from *ruber*, red, in allusion to the dye which is extracted from the plant.

Soil.—For the hard-wooded kinds a good alluvial soil mixed with one-fourth part of broken potsherds and for the soft-wooded the same mixture with one-fourth leaf mould added.

COFFEA* ARABICA,† *Boon.*

When not disturbed by the leaf disease—a fungus which has committed great havoc on coffee plantations—this valuable shrub thrives well at from 3 to 1,000 feet altitude in Southern India on a soil rich in vegetable matter, such as is found when a forest is cut down. At an altitude of 1,000 to 2,000 feet it also grows well on alluvial soil, with the aid of regular watering. At Poona it grows well on decayed trap soils regularly watered, and occasionally produces such heavy crops that it is doubtful whether its cultivation under irrigation on a large scale in that district would not be profitable; the difficulty would be to get sufficient land of a suitable kind within a ring fence and under a canal. In gardens throughout the country it can easily be kept as an ornamental shrub, flowering freely. Propagation by fresh seeds, which have been dried without removal of the pulp.

COFFEA LIBERICA.‡

This species, which was introduced some years ago, has not made much progress. Its leaves are large and it needs a more moist climate than is necessary for *Coffea Arabica.*

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* *Coffea*, from Coffee, a province of Tarea, in Africa, where the common coffee grows in abundance.

† *Arabica*, from Arabia.

‡ *Liberica*, from Liberia.

IXORA.*

A genus of very ornamental shrubs having opposite entire smooth leaves with intrapetiolar persistent stipules. Flowers of 4 or rarely 5 petals in dense tripartite corymbs. Many of this genus are indigenous to India and thrive well in gardens. A great number of varieties have lately been raised: those offered by Mr. W. Bull of Chelsea, London, are described below and will certainly be great acquisitions in our gardens. Ixoras thrive specially in moist districts, but with slight shade and irrigation can be grown successfully throughout India:—

"To induce the hybrid varieties of this genus to flower freely a bed of sandy loam mixed with a liberal supply of old manure should be prepared in a position slightly shaded and with irrigation available, the upright-growing varieties being planted in the centre and the dwarf sorts towards the sides, *Gladiolus*, or other plants of similar habit may be planted between the Ixoras to enliven the bed until the principal occupants have grown up. The after treatment necessary is a yearly dressing of fresh loam before the rainy season; much manure is apt to induce growth more than flowers, and a thin screen to keep the sun off and enlarge the blooms during the flowering season which extends from December to February. Propagation is effected by half ripened cuttings in sand under a frame and by seeds.

IXORA ACUMINATA.†

A shrub of upright habit with few branches. Flowers in cold season in Deccan, pure white, fragrant, large, tube 1½ inches in length; leaves petiolate, broad, lanceolate, smooth.

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* *Ixora*, meaning doubtful

† *Acuminata*, having pointed leaves.

IXORA COCCINEA.*

Dwarf bushy habit, flowers bright red in large heads, leaves sessile, cordate, oblong, acute, shining. Abundant in the Concan. In Calcutta this plant is used as an edging for wide roads with very satisfactory effect.

IXORA COCCINEA BHANDUCA

Is a variety of the above with scarlet flowers.

IXORA MACROTHYRSA,† *Botanical Magazine, No.* 493, *Tab.* 6853.

Other species of *Ixora* are so successful in our gardens in moist districts that the introduction of this grand species may be confidently looked for soon. It has bright red flowers produced in heads 8 inches in diameter and in other respects closely resembles *Ixora acuminata.*

IXORA LANCEOLARIA.‡

Flowers greenish white in terminal corymbs, leaves lanceolate 9 × 1 inch, pallid, smooth, with nerves running parallel almost at right angle with the midrib.

The following garden vareties are in Mr. W. Bull's recent list:—

IXORA AMBROSIA,§

A distinct and very free-blooming variety, producing fine trusses of flowers of a bright orange salmon colour.

IXORA AURORA,||

Fine trusses of large attractive flowers, orange-buff on opening, changing afterwards to bright salmon.

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* *Coccinea*, scarlet. † *Macrothyrsa*, having a large crowded inflorescence.

‡ *Lanceolaria*, lance-leaved. § *Ambrosia*, pleasing to taste or smell.

|| *Aurora*, goddess of morning.

IXORA BELLA.[*]

An exceedingly pretty and effective variety, producing fine trusses of flowers of a salmon-pink colour, shading off to light salmon.

IXORA CHELSONI.[†]

The flower pips of this splendid variety are of large size and of exceptionally good form and great substance ; they are produced in immense round full trusses ; colour bright orange-salmon, flushed and shaded with pink.

IXORA CONCINNA.[‡]

A splendid variety producing large and compact trusses of fine flowers, which on first expanding are of a bright salmon colour, but gradually change to deep salmon-pink ; extremely beautiful.

IXORA DECORA.[§]

Yellow flaked with rosy crimson ; remarkably attractive ; a magnificent variety producing noble trusses of very large fine flowers.

IXORA EMINENS.[||]

A splendid variety of exceptional merit, giving trusses of fine, large, well-formed flowers, clear buff on opening, changing afterwards to light salmon-pink.

IXORA EXIMIA.[†]

This variety produces fine large trusses of pips with very long tubes ; the colour on opening is buff, changing afterwards to salmon pink.

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[*] *Bella*, handsome.

[†] *Chelsoni*, Chelson's.

[‡] *Concinna*, neat.

[§] *Decora*, decorous.

[||] *Eminens*, large.

[¶] *Eximia*, excellent.

IXORA GEMMA.[*]

A fine addition to this showy and effective genus. It has round and well-formed pips of a rich orange yellow colour, produced in large and compact trusses.

IXORA ILLUSTRIS.[†]

A splendid variety, producing immense trusses of flowers of a fine bright orange-salmon colour; extremely showy and ornamental.

IXORA INSIGNIS.[‡]

A fine variety of close dwarf habit; deep rosy crimson shaded with orange, borne in a compact truss.

IXORA MIRANDA.

This variety produces compact trusses of flowers which on first opening are of a buff colour, but change gradually to a rosy-salmon shade.

IXORA ORNATA.[§]

A remarkably free-blooming variety, producing good trusses of bright orange-salmon flowers in the greatest profusion.

IXORA PICTURATA.[‖]

An extremely floriferous variety; the flowers on first opening are of a bright orange colour, which gradually change to buff.

IXORA PROFUSA.

An extremely free-flowering variety, producing very fine huge trusses densely furnished with flower pips of a beautiful rich soft rosy salmon colour.

IXORA SPLENDIDA.

A magnificent variety producing profusely very large and handsome trusses of flowers of a rich bright orange-crimson colour, remarkable, showy, and attractive.

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[*] *Gemma*, a jewel. [†] *Illustris*, brilliant. [‡] *Insignis*, remarkable.
[§] *Ornata*, ornamental. *Pictura*, painted.

IXORA VENUSTA.[*]

A beautiful variety producing fine trusses of very large flowers, which on first opening are of a bright orange colour, changing afterwards to salmon-buff.

RONDOLETIA[†] ODORATA.[‡]

A hard-wooded shrub having leaves in opposite rather remote pairs, ovate, acute, or somewhat acuminate entire waved on very short petioles. Branches rounded, downy, and producing fine trusses of orange scarlet flowers. Cuttings of half ripe wood taken during the cold season strike root under a glass frame if very carefully watered, excess being very fatal. The odour of this flower is not generally remarkable in our climate.

HOFFMANNIA[§] GHESBREGHTII.[||]

A very handsome undershrub or herbaceous plant suitable for the glass conservatory. It has a straight, four-angled, and winged stem opposite attaining 3 feet in height, broadly lanceolate, pointed, entire, with prominent veins, and of a dark velvety green above and deep red beneath. A variety with white variegation and of more delicate growth is in cultivation. When the plant loses its lower leaves in the hot season it should be cut down to within two inches from the soil. If the cuttings are placed in a moist shaded frame nice young plants will be quickly obtained and the old stock will shoot out again with vigour. Only one growth should be encouraged. Soil should be rich in leaf mould and sand, and kept moist during the growing season.

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[*] *Venusta*, lovely.

[†] *Rondoletia*, after William Rondolet, a scientific physician, 1507-1566.

[‡] *Odorata*, odorous.

[§] *Hoffmannia*, after G. T. Hoffmann, professor of botany at Gottingen, 1862.

[||] *Ghesbreghtii*, Ghesbreght's.

PAVETTA * INDICA.

A large shrub valued for its elliptic, lanceolate, shortly petioled leaves with a distinct white midrib.

GARDENIA† GUMMIFERA.‡

A woody bush with resinous buds and opposite, sessile or nearly sessile, oblong, pointed, shining leaves 2 to 4 inches in length widened towards the apex and having 15 to 20 pairs of veins running from the midrib to the margin (nerves). Flowers with very short stalks pure white while fresh and 3 inches diameter, succeeded by ellipsoid fruit one inch in length. This very beautiful shrub thrives on a deep stony soil with occasional watering. It may be raised from seed or by layering. Plant from layers flower the first season.

GARDENIA FLORIDA,§ *Gunduraja.*

The double-flowered variety of this neat shrub is much valued in the districts where it thrives, those being such as have heavy rainfall during a part of the year; in other districts its place is taken up by the showy *Tabernæmontana coronaria, Tagar, Gardenia florida,* is in our climate of slow growth forming a compact shrub bearing opposite elliptic leaves, acute at both ends and almost terminal solitary white flowers 1 inch diameter having a powerful perfume.

MUSSÆNDA|| FRONDOSA

And allied species are showy shrubs having small white or orange-coloured flowers with one of the calyx lobes developed into a pure white leaf varying much in form and size.

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* *Pavetta*, the vernacular name of the plant in Malabar; *Indica*, from India.

† *Gardenia*, in honour of Alex. Garden, of Charleston, Carolina, one of the correspondent of Ellis and Linnæus.

‡ *Gummifera*, gum-bearing. § *Florida*, flowery.

|| *Mussænda*, a name applied by Singalese to some of the species; *frondosa*, leafy.

In Calcutta gardens these shrubs grow freely and on the Western Ghauts southwards and other moist districts are indigenous. Propagation is easily effected by cuttings and seeds.

DIPSACEÆ.*

This very small group of herbaceous plants include a few garden favourites.

SCABIOSA† ATROPURPUREA‡

Is in this climate an annual. If sown at the end of the rainy season a fine show of bloom may be expected about January and February. Rocks, loose loam, and steady watering are necessary.

SCABIOSA WEBBIANA§

Is of dwarf growth, large yellow flowers, and pinnatified hairy leaves. At Baroda this forms a showy bedding plant during January in sandy soil regularly watered. It may be sown from September to December.

COMPOSITÆ.

The Aster or Sunflower Family.

A larger natural order of herbaceous plants, rarely shrubs, distinguished by the remarkable infloresence commonly called the flower, consisting of numerous small flowers seated close together on one fattened stalk called a head, as may be seen on dissecting a sunflower, *shewuntee*, *karala*, or aster. The order includes many beautiful flowers and several valuable oil-seeds, as sunflower, *Helianthus annus*, *kurdee* or *kosumba*; safflower, *Carthamus tinctorius*, *karata* or *khorasanee*; *Guizotia Abyssinica*, and several medicinal plants, as chamomile and *downa*.

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* *Dipsaceæ*, from the genus *dipsacus*, a Greek name used by Dioscorides, from *dipsao*, to thirst, probably in consequence of the connate leaves of *dipsacus* holding water.

† *Scabiosa*, from *scabies*, the itch, which disease the common species is said to cure.

‡ *Atropurpurea*, dark purple.

§ *Webbiana*, Webb's.

For cultivation a very well worked soil, enriched with leaf mould and sufficient water to keep the soil moist during the growing season, is necessary.

Propagation is effected by seeds, division, or cuttings, and yearly transplanting to fresh soil desirable for perennial species.

THE DAHLIA.*

This showy flower has, in the hands of the florist, been divided into two distinct classes, both of which are popular in dry districts like the Deccan, where there is not too much rain during the wet season, or in hilly districts where altitude compensates for excess of rain in this country. The old double varieties form great globes of vivid colour and the new single-flowered varieties are remarkable for profusion of bloom combined with brilliant colour.

For the cultivation of either sort a very rich soil is necessary, and dried fish will be found in some places a very convenient means of enriching the soil; old cow-dung may also be used in considerable quantity.

The old double varieties are propagated in this country by dividing the root when it is showing growth in May. This must be done very carefully, taking pieces showing fresh buds with some of the thick roots attached These should be potted and watered carefully until fresh roots are formed, then planted out or potted in very rich soil.

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* *Dahlia*, named in honour of Dr. Dahl, a Swedish botanist and pupil of Linnæus.

The young shoots may also be struck as cuttings on a bed of fermenting material called a hotbed, covered by a frame with glass top, kept shaded from bright sunshine. But this requires considerable skill to manage, as excess of moisture is apt to be produced, causing decay.

The new single varieties are grown from seed, which should be sown between the beginning of May and the end of July; if good it germinates in a few days. When two inches high the plants should be transplanted to other pots or beds of carefully prepared soil in a moist shady place and may be put in 4 to 5 inches apart. Here the plants remain until six inches high, when they should be transplanted to their final quarters. If a mass of flowers is required the plants should be put in 3 feet apart and a neat stake provided to support each plant. *Bloom* will begin from early sowings about the middle of August and by late sowings continue till December.

The treatment detailed for the single dahlia will be found suitable for—

COREOPSIS TINCTURIA.*—Flowers maroon and yellow, tall.
COREOPSIS ARISTOSA.†—Flowers maroon and yellow, dwarf.
TAGETES ERECTA.‡—African Marigold; *Gendu.*
TAGETES PATULA.§—French Marigold, *Machamul.*
HELIANTHUS ANNUS.||—Sunflower, *Suriachaphul.*
SPILANTHES¶ ACMELLA.—*Ikulkara.*

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* *Coreopsis*, *koris*, a bug, and *opsis*, like, referring to the appearance of the seed. *Tincturia*, coloured.

† *Aristosa*, having sharp points.

‡ *Tagetes*, a name of mythological derivation, from Tagers, one of the Etruscan deities. *Erecta*, erect.

§ *Patula*, spreading.

|| *Helianthus*, the sunflower. *Annus*, of one year.

¶ *Spilanthes*, from *spilos*, a spot, and *anthos*, a flower, in allusion to the original species having a brown spot in the centre.

CALENDULA OFFICINALIS.*—Marigold.
ZINNIA ELEGANS.†
CALLISTEPHUS HORTENSIS.‡—German or Chinese Aster.
CENTAUREA CYANUS.§
COSMOS BIPINNATUS. ||

LACTUCA¶ SATIVA, *Lettuce*,

Is one of the plants that have been so long in cultivation that its native country is doubtful. In this country it can be grown to perfection. It is eaten after dressing with various mixtures of oil, vinegar, salt, &c., without cooking, and is the chief of the vegetables called salad by the English. In districts with slight rainfall seed should be sown fortnightly from the beginning of the rainy till the end of the cold season. With heavy rainfall, the rainy season should be half over before sowing and the early crops raised under shelter and planted out on elevated beds. When the young plants are fit to handle, they should be planted out 9 inches apart in a bed of very rich friable soil and watered slightly once a day in dry weather. If inclined to spread tie the outer leaves together at the top. This will cause the plants to "heart."

To be tender and crisp lettuce must be grown rapidly, and in hot weather should be shaded during the heat of the day.

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* *Calendula*, from *calendæ*, the first day of the month, in allusion to the almost perpetual flowering. *Officinalis*, sold in shops.

† *Zinnia*, named after Zinn, a German botanist. *Elegans*, elegant.

‡ *Calistephus*, from *kalistos*, prettiest, and *stephos*, a crown, in allusion to the appendages on the ripe fruit. *Hortensis*, of gardens.

§ *Centaurea*, from *kentaurion*, the name given by Dioscorides to the century, *Erythræa centaurium*. *Cyanus*, dark blue.

|| *Cosmos*, from *kosmos*, beautiful. *Bipinnatus*, having two pinnæ.

¶ *Lactucas*, the old Latin name, from *lac*, milk, with reference to the milky juice.

To save seed, select the best developed plants during December and transplant to a fresh soil. All inferior plants that have not grown fit for table should be rooted out and not allowed to flower, if this is not attended to, the seeds from the selected plants will be inferior.

There are two distinct types, cabbage and cos. The cabbage lettuce have broad rounded leaves forming a low spreading head. The cos lettuce has more narrow and upright leaves. The following is Mr. W. Bull's select list with prices in London —

CABBAGE VARIETIES.

	Per oz.—*s.*	*d.*
ALL THE YEAR ROUND, a very hardy compact sort, white, solid, and crisp	1	0
BROWN DUTCH, hardy, fine for autumn sowing	0	8
DRUMHEAD or MALTA, one of the largest and best summer lettuces	0	9
EARLY PARIS MARKET, this very distinct and handsome variety is extensively cultivated in the Paris Market Gardens	1	0
GRAND ADMIRAL or ROYAL, large and crisp	0	8
HAMMERSMITH HARDY GREEN, the best for standing the winter	0	8
NEAPOLITAN, very firm-hearted, tender, crisp, and early	0	8
NEW YORK, large solid head, tender, crisp, and excellent flavour		
STANSTEAD PARK, one of the hardiest varieties in cultivation	0	9
TOM THUMB, very sweet, solid, and compact	1	3
VICTORIA or RED EDGED, hearts quickly and stands the summer well	0	9

COS VARIETIES.	Per oz.—*s.*	*d.*
BROWN, BATH, or BEARFIELD, white-seeded, large and sweet: stands the winter well	0	10
BROWN or BATH, black-seeded, resembling the preceding, except in the colour of the seed	1	3
HICK'S HARDY WHITE, fine for spring or autumn sowing, stands a long time	1	3
LONDON SUPERB WHITE, large, crisp, and sweet	1	0
NONSUCH *(Ivery's)*, a most valuable variety for summer use	0	10
PARIS or BRIGHTON GREEN, a well-known sort	0	10
PARIS WHITE, large, compact, and crisp, excellent for summer	0	10

POONA BROWN COS LETTUCE.

A lettuce with black seed closely resembling the Bath Cos was introduced at Poona by a clergyman 30 years ago and has become perfectly acclimatised: it is the favourite of the market gardeners because it is large and packs and bears carriage well, and of the consumer because it is crisp and of delicious flavour It does not '*stand*' long, but lettuce remarkable for long standing without sending up a flower stalk in this climate have generally got other characteristics that are not so desirable. As no annual plant brought from England can be grown 30 years at Poona and retain all its original characteristics, this variety may now be called the Poona Brown Cos. It is a large lettuce of the true cos form and black-seeded. Leaves a rich brown outside, greenish white inside, tender, crisp, and of good flavour. The seed is procurable from any Poona seed merchant at 4 annas per ounce.

ARTEMISIA ABROTANUM,[*]

The southern wood of English gardens, is of easy culture with ordinary border treatment in dry districts, and with additional precautions against flooding elsewhere.

ARTEMISIA VULGARIS,[†] *Downa, Gundmar, Dona,*

One of the varieties of this plant with pinnatified villous leaves is grown in large quantities at Allundie, near Poona, for use in Hindoo ceremonies.

CROSSOSTEPHIUM ARTEMISIODES.[‡]

A very useful bedding plant, having small, alternate, much-divided leaves of greenish grey colour, which contrasts well with Alternanthera and other dark-coloured plants During the cold season it bears small heads of yellow flowers, which should be cut off when they appear. Propagation by cuttings in sandy soil kept steadily moist is easy.

HELIPTERUM MANGLESII,[§] *Rhodanthe Manglesii.*
ACROLINUM ROSEUM,
BRACHYCOME IBERIDIFOLIA,
HELICHRYSUM ANNUM,
SANVITALIA PROCUMBEUS,
CACALIA COCCINEA,
CENTAUREA CYANUS,
CHARIEIS HETEROPHYLLA,

Are of easy culture if sown after the rainy season is past.

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[*] *Artemesia*, from Artemus, the Greek name of Diana. *Abrotanum*, an aromatic herb.

[†] *Vulgaris*, common.

[‡] *Crossostephium*, having a fringed crown, referring to the fruit. *Artemesiodes*, like Artemesia.

[§] *Helipterum*, *helios*, the sun, *pteron*, a wing, referring to the *pappus*. *Manglesii*, Mangles'.

TARAXACUM * OFFICINALIS, *Taraxacum.*

This is chiefly grown for use in medicine, and its cultivation was during many years carried on successfully near Poona on a carefully worked loamy soil manured with well decayed village sweepings and arranged for irrigation. The seed may be sown in August in lines 6 inches apart—careful thinning, weeding, and regular watering is all that is necessary till January, when the seed should be collected for future sowing and the plants dug up in February and March. A fair crop is 1,500 lbs of fresh roots per acre, which yield about 18 per cent of the medicinal extract.

ASTER AMELLUS,†

A dwarf, herbaceous, perennial well suited for bedding purposes from its oblong lanceolate radical leaves of a greyish purple shade, and its very numerous head of purple flowers produced in the cold season. In the Deccan this plant thrives with ordinary border treatment, and it is worthy of more attention than it has received hitherto.

HELIANTHUS TUBEROSUS,‡ *Jerusalem artichoke.*

The tubers of this plant form a very delicate vegetable, and its cultivation being easy and produce considerable it should be more commonly grown. Any fair garden soil is suitable if well worked and manured. Tubers should be planted about the time young shoots appear; this is generally about a month before the monsoon is due. Plant in lines eighteen inches apart with one foot between the tubers. Water enough to keep the soil moist. The tubers will be ready by September. Use the tubers as soon as they are well developed, but before hardening. When the stems have dried up, cut them away, and cover the bed with litter six inches deep; this will keep the tubers in order for seed the following season.

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* *Taraxacum*, from *tarasco*, to disturb, to alter, from its supposed effect on the blood.

† *Aster*, a star, the shape of the flower heads *Amellus*, the Latin name.

‡ *Tuberosus*, bearing tubers.

GLOBE ARTICHOKE, *Cynara scolymus*,

This grand herbaceous plant grows well in the Deccan and is useful as an ornamental plant, but so few form the flower head that as a vegetable it is of no value, except when treated as the cardoon by tying up the leaves to shut out the light and make the centre white and tender.

CICHORIUM INTIBUS, *Chicory*,
TRAGOPOGON* PORRIFOLIUS,† *Salsafy*, and
SCORZONERA‡ HISPANICA, *Scorzonera*.

May all be grown in the Deccan on very deeply worked soil heavily manured and irrigated if sown in August. Under a heavy rainfall the young plants will decay; therefore in wet districts sowing must be deferred.

GUIZOTIA ABYSSINICA,§ *Kala teel*, *Khorasnee*.

A very important oil seed, cultivated on the poorer class of soils and sown about the end of July. It is an herbaceous plant attaining 2 feet in height and bearing very numerous flowers of beautiful shade of yellow. It may be had in bloom from the beginning of September till March by making a fresh sowing once in ten days from July till January. Ordinary garden soil kept moist is sufficient. In the public gardens in Bombay this is one of the first plants that lights up the flower beds when the monsoon is over.

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* *Tragopogon*, goat's beard, alluding to the long silky beard of the fruit.

† *Porrifolius*, having leaves like the leek.

‡ *Scorzonera*, from the old French *scorzon*, a serpent, in allusion to supposed effects against snake-bites. *Hispanica*, from Spain.

§ *Abyssinica*, from Abyssinia.

CHRYSANTHEMUM* INDICUM, *Shewuntee, Chamunti, Gool-daoodee.*

A few varieties of this popular flower are in cultivation on a large scale in market gardens for cut flowers, and occasionally plants of the fewer varieties are to be met with, but rarely in the condition the plant is capable of. To grow the chrysanthemum prepare a large bed in a place exposed to the morning sun and with abundant light all day, but shaded from direct sunshine after noon. Enrich the soil with plenty of manure of the strongest sort available, work the soil thoroughly, and arrange for irrigation. After the flowering season turn out the old plants and tear apart, plant short healthy pieces having a few roots about one foot apart, shade slightly for a few days, and when growth commences water freely. If the district is one with rainfall under 40 inches, prepare a fresh bed in a place more exposed to sunshine yet sheltered from strong winds. A bed of standard roses 5 feet apart is suitable; transplant at the beginning of the rainy season, moving a good ball of earth with the plants, and put out 3 feet apart, or, if among other plants, at convenient distances, water freely with liquid manure, and stir the surface at short intervals If the rainfall is heavy it will be better to plant in large pots which may rest on bricks near the sheltered side of a wall, so that a great part of the rain may pass over them, and replant in the borders as soon as the rain is nearly over.

GOODENOVIEÆ.†

Two sea-shore shrubs that are frequent occupants of the shrubbery in gardens belong to this family, *Scævola*‡ *Kœnigii* and *Scævola Lobelia.*[*] Those shrubs have stout succulent branches, smooth green alternate exstipulate entire elliptic obtuse leaves and spikes of white flowers resembling a Lobelia in shape succeeded by sub-spherical drupes with a bony endocarp. Propagated easily by cuttings and grown in the shrubbery with occasional watering.

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* *Chrysanthemum*, golden flower.

† *Goodenovieæ*, from the genus *Goodenia*, in honour of Dr. Samuel Goodenough, Bishop of Carlisle, 1743-1827.

‡ *Scævola*, *scæva*, the left hand alluding to the form of the corolla

CAMPANULACEÆ,[†]

The Bell Flower Family,

Is a family of herbaceous plants, valued for the beauty of its flowers, and propagated by seeds or cuttings; the latter require a bell glass or frame to strike root, and are not easily managed. Seed is to be preferred.

CAMPANULA MEDIA [‡]

And the other beautiful bell flowers that are easily managed in Europe are delicate and short-lived here, but can be flowered if kept on a moist border, shaded from midday sun.

LOBELIA[§] ERINUS.[||]

This pretty little blue-flowered plant may be sown between July and November, the former date for light rainfall, the latter for heavy.

LOBELIA TRIGONA,

A pretty little creeping plant with triangular stems bearing ovate, sub-sessile, alternate, minutely-toothed leaves and pale blue Lobelia-like flowers. In wet sand this little plant grows freely and is very ornamental; covering the soil with its delicate leaves and abundant flowers. Culture in pots or in small beds shaded from midday sun is suitable. The soil should be one-half good loam and one-half decayed garden sweepings. As the seed is very small, mix with finely sifted soil to assist equal distribution, and water the pot or bed thoroughly before sowing. Sow thinly, cover with a slight sprinkling of fine soil and shade with a mat, held a few inches above the surface, to keep in moisture, so as to avoid watering if possible until the seed has germinated. When the seed has come up, gradually raise the mat to admit light, and water gently, as the little plants are very delicate when young. If the seed has come up thickly transplant little tufts.

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[*] *Lobelia,* having flowers shaped in the genus *Lobelia.*

[†] *Campanulaceæ,* from the genus *campanula,* a little bell.

[‡] *Media,* medium.

[§] *Lobelia,* after Mathias de L'Obel, a botanist and physician to James I. 1538-1616.

[||] *Erinus,* from Erinnys, one of the fairies.

LOBELIA NICOTIANÆFOLIA,* *Doeul,*

Forms a handsome rock-work plant. It is raised by sprinkling the seed on the higher parts of rock-work kept regularly moist and thinned out greatly, as one plant in five feet is sufficient.

ISOTOMA† LONGIFLORA‡

Is a very hardy white-flowered plant, which is very pretty when sown on moist rock-work, but must be thinned out freely, as it propagates itself from seed to a great extent.

ERICACEÆ.§

The Heath Family.

This family has no indigenous members in the plains of India, but on the hills, above 7,000 feet, is represented by magnificent Rhododendrons:‖ in our gardens we have

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* *Nicotianæfolia*, having leaves like the tobacco plant.

† *Isotoma*, from *isos*, equal, and *toma*, a section—segments of the corolla being equal.

‡ *Longiflora*, long-flowered.

§ *Ericaceæ*, from the genus *erica*, derivation doubtful.

‖ *Rhododendron*, from *rhodos*, a rose, and *dendron*, a tree.

ARBUTUS[*] UNEDO,[†]

Which grows freely at Poona with ordinary shrubbery treatment, making a handsome shrub with oblong, lanceolate, smooth leaves, having minute teeth and arranged alternately on rapidly grown parts, oppositely towards the ends of the branches. The flowers are small and white. The large scarlet globose granular edible fruit has not been produced at Poona.

PLUMBAGINEÆ.[‡]

This small group has a few popular garden plants.

PLUMBAGO ZEYLONICA.[§]

A handsome indigenous shrub having alternate entire acute leaves and long spikes of white five-lobed flowers and a calyx with glandular hairs.

PLUMBAGO ROSEA.[‖]

Closely resembles the above, differing chiefly in the red colour of the flower.

PLUMBAGO CAPENSIS[¶]

Is of a pale blue colour and is a very pretty plant when grown on a trellis protected from the sun on the southern side. It runs up the trellis about six feet and throws out spikes of lovely pale blue flowers 18 inches. At Bangalore being trimmed to 18 inches in height, it is used as a margin for wide roads with very fine effect. Those three species of Plumbago are easily propagated by cuttings.

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[*] *Arbutus*, from *arboise*, Celtic for austere bush, in allusion to the taste of the fruit.

[†] *Unedo*, *unus*, one, and *edo*, I eat.

[‡] *Plumbagineæ*, from the genus *plumbago*, the old Latin name used by Pliny, from *plumbum*, lead, the plant is said by him to be efficacious in curing the lead disease.

[§] *Zeylonica*, from Ceylon.

[‖] *Rosea*, rose-coloured.

[¶] *Capensis*, from the Cape of Good Hope.

PRIMULACEÆ.*

This is a group of herbaceous plants chiefly native of temperate climates: a very pretty member is abundant with us.

ANAGALLIS† ARVENSIS, *The Pimpernel.*

A charming little herbaceous plant with opposite entire leaves and solitary axillary stalked flowers mostly of a very deep blue with a crimson eye, sometimes red or white and appearing from December to April, ½ inch in width. This is a very widely distributed plant and grows by the side of the irrigation channels and other moist places. It is propagated by seed.

PRIMULA SINENSIS, *The Chinese Primrose.*

This favourite of English gardens may be raised from seed sown at the end of the rainy season and in the districts that have a mild cold season attains fair development before it gives way to the heat. A position sheltered from the sun yet with abundant light and a sandy soil carefully watered are the necessary conditions for its culture. In watering extra care is necessary as the young plants are very delicate.

CYCLAMEN PERSICUM.

The conditions detailed above are also suited to the *Cyclamen.* When raised from seed the plants are very delicate while young and apt to disappear. Imported roots give flowers freely during some months in the cold season with ordinary care.

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* *Primulaceæ*, from the genus *primula*, from *primus*, first, in allusion to its early flowering in spring.

† *Anagallis*, from *anagelco*, to laugh again, removing despondency--name given on account of supposed medicinal virtues. *Arvensis*, inhabiting ploughed fields.

MYRSINEÆ.*

A group of shrubs or small trees with alternate, undivided, gland-dotted leaves. A few are handsome plants for the garden.

ARDISIA† HUMILIS.

An erect-growing shrub having leathery leaves 6 × 2½ inches and pendulous umbels of bright pink flowers succeeded by a black berry. It is propagated by seeds and thrives with ordinary treatment.

SAPOTACEÆ,‡

The Sapodilla Family,

Is a small group of trees, much valued in gardens for the sweet perfume of the flowers given by *Buchool* (Mimusops elengi) and the Sapota fruit. Propagation in this family is most easily effected by seeds sown within two months of ripening and in the meanwhile kept in the fruit. Layers may also be employed, but a long time is required to get good roots.

ACHRAS§ SAPOTA, *Chicoo*, *Sapotilla*.

Sapota is a small fruit tree of slow growth, which thrives best in a reddish loamy soil near the sea, but grows fairly in black soil in the Deccan. Water sufficient to keep the soil moist should be given when the tree is young; but after the tree is established with its roots a considerable depth in the soil, water should be given in large quantities once a month in dry weather.

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* *Myrsineæ*, from the genus *myrsine*, an old Greek name used by Dioscorides for the myrtle.

† *Ardisia*, from *ardis*, a point, in allusion to the pointed anthers. *Humilis*, humble.

‡ *Sapotaceæ*, from the genus *sapota*, the native name.

§ *Achras*, the Greek name for the wild pear.

MIMUSOPS[*] ELENGI, *Buchool, Bolesaræ, Taindoo,*

Is a large tree of slow growth, having leaves 3½ × 1¾ inches, smooth and rhomboid at the base, with numerous slender nearly horizontal nerves and a stalk ¾ inch in length, yielding an immense number of small, white, sweet-scented flowers having a corolla of 16 to 20 narrow lanceolate lobes, succeeded by an egg-shaped yellow one-seeded berry. It thrives in deep alluvial soil on a river bank or on the banks of a tank. Propagate by fresh seeds.

CRYSOPHYLLUM[†] CAINITO

Is a small tree having the underside of the leaf covered with very short golden-coloured hairs. A soil formed of a mixture of building rubbish with good loam in equal parts suits it well. Propagate by fresh seeds.

Seedlings of this tree have upright stems with branches in whorls spreading nearly at right angles and the fruit varies to a great extent; therefore, although layers do not make as handsome trees as seedlings, they bear fruit sooner and its quality will be exactly the same as the parent under similar treatment.

The fruit is egg-shaped, of a brown colour, and rough skin. A cross section shows a star-like arrangement of black seeds and abundant milky juice.

OLEACEÆ,[‡]

The Olive and Jasmine Family,

Is a group of trees, and shrubs of great importance as the source of olive oil, and in our gardens yielding many sweet-smelling flowers. As a rule propagation by cuttings is easy, but the olive is propagated by taking the suckers which spring up near the stem of the parent plant with a portion of the root or by seed, the good varieties being budded on to the seedlings.

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[*] *Mimusops*, from *mimus*, an ape, and *opsis*, resemblance, in allusion to a fancied resemblance between the flowers and an ape's countenance.

[†] *Chrysophyllum*, golden-leaved, in allusion to the golden appearance of the under side of the leaf.

[‡] *Oleaceæ*, from the genus *olea*, from *elaia*, an olive tree

OLEA SATIVA, *The Olive Tree.*

The olive tree grows freely in Western India when treated as a garden tree, but rarely flowers and never ripens fruit. Specimens of many years of age are in an old garden at Hewra.

OLEA CUSPIDATA.*

A bushy tree of N.-W. Hymalayas and Kashmir, having opposite, oblong, entire leathery leaves 2½ × ¾ inches pointed or blunt and having the nerves on the lower side of the leaf obscured by ferruginous felted scales. This tree grows freely with ordinary border treatment and may be transplanted safely when of large size. The flowers are small and rarely produced in the plains.

OSMANTHUS† FRAGRANS,‡ *Olea fragrans.*

This is one of the choicest of our garden shrubs. Its leaves are opposite, entire, or saw-edged, rigid, leathery, of a bluish green tinge, and attain 7 × 2 inches, but are usually much smaller. Its flowers are small, white, with a four-lobed corolla, delightfully fragrant and produced in dense branches from the ends of the branches or the leaf axils during the cold season. Fortune, the traveller in China, says the flowers are used for perfuming tea.

In dry districts this shrub thrives well with ordinary garden border treatment. It is propagated chiefly by layering, which is a tedious process, and also strikes root feely from cuttings of half-ripened shoots inserted in sand covered with a bell glass and kept inside a shaded garden frame.

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* ***Cuspidata***, **having sharp, stiff points.**

† ***Osmanthus***, **from *osme*, perfume, and *anthos*, a flower.**

‡ ***Fragrans***, **fragrant.**

JASMINUM.*

The species and varieties of this genus, including *Jai*, *Mogra*, are much valued as flowering plants ; all thrive in good loamy soil, and require to have the branches that have given flowers cut back to half length about a month after flowering. At the same time manure should be dug in about the roots, and a liberal watering given when fresh flower shoots will appear, and three crops of flowers yearly may be obtained from some of the kinds.

JASMINUM SAMBAC,† *Mogaree, Moota-bella, Burra-bella.*

A dwarf spreading shrub, having opposite, entire, nearly sessile, heart-shaped or oblong, pointed leaves, and double sweet-smelling flowers produced in dense cymose bunches. It thrives in a rich border, needs regular pruning after the flowers have past, and is propagated by layers.

JASMINUM HUMILE,‡ *Jasminum chrysantkemum,§ Hemapaoopika.*

A rigidly erect shrub having alternate pinnate leaves of 3 or more rhomboid oblong leathery leaflets of a deep green colour and variable in size, but often ¾ × ½ inch, and bright golden flowers ¾ inch in expansion in terminal corymbs of 10 to 20 flowers. Ordinary border treatment suits this species well, and it is easily propagated by cuttings.

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* *Jasminum*, from its Arabic name.

† *Sambac*, Arabian.

‡ *Humile*, dwarf, humble.

§ *Chrysanthemum*, golden-flowered.

JASMINUM GRANDIFLORUM,* *Jai, Malutee, Jatee, Kund.*

A graceful shrub with spreading pendulous branches when growing in an open place, but twining freely when shaded and bearing opposite pinnate leaves of about 11 rhomboid oblong leaflets less than one inch in length. The flowers are produced in abundance, pure white, circular, 1½ inches in expansion, and sweet-scented. A mass of this shrub in flower seen by moonlight is very charming. Ordinary garden treatment and propagation by cuttings suits it.

JASMINUM CALOPHYLLUM.†

A very beautiful shrub of slightly scandent habit and bearing opposite leaves of three ovate acute leaflets, and pure white 10-lobed flowers 1 inch in expansion. This plant is grown to fine effect in the Public Park, Baroda.

JASMINUM PUBESCENS.‡

A climbing shrub with branches and leaves softly hairy; the leaves are short-stalked, ovate, lanceolate, 2½ × 1 inch, rounded or cordate at the base and densely covered with short, soft hair. The flowers are white, somewhat fragrant, 1 inch in diameter, double in garden varieties, in dense heads at the ends of branches and having full-sized leaves close under the flowers. This is a very satisfactory plant for a trellis.

It is indigenous in our hilly districts and does not require special care, it is propagated by seed and cuttings.

JASMINUM UNDULATUM.§

Closely resembles the above, except in the degree of pubescence on the leaves.

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* *Grandiflorum*, large-flowered.

† *Calophyllum*, beautiful-leaved.

‡ *Pubescens*, having short soft hairs.

§ *Undulatum*, wavy.

NYCTANTHES[*] ARBOR-TRISTIS,[†] *Harsinghar*, *Parajatak*,

Is a hardy member of this family, which grows in any garden soil, and is easily propagated by seeds.

It is easily identified by its peculiar habit of casting off the fragrant white corolla with an orange tube, early in the morning.

APOCYNACEÆ,[‡]

The Dogbane Family,

Is a group of shrubs and climbers remarkable for the beauty of their flowers. The greater number of members of this family have opposite entire leaves and milky sap and are distinguished from *Asclepiadaceæ* by the pollen being powdery instead of cohering in masses. The plants grow freely when planted out in a rich garden soil, well drained, and are propagated by seed or layers, and by budding superior on to common varieties. A few of the species may be propagated easily by cuttings.

NERIUM ODORUM,[§] *Oleander*,[||] *Kuner*, *Sweta*, *Raravira*, *Kurubee*, white variety; *Rukta Kurubee*, red variety.

The improved German varieties of this plant, which have been introduced at Gunesh Khind, are among the finest flowering shrubs in cultivation. The colour of the flowers varies from pure white to dark crimson, the perfume is sweet, they last well when cut, are produced at intervals throughout the year, and the pure white double sort is most useful for bridal bouquets. A sandy or stony soil with irrigation available is suitable : in stiff soil the plants do not thrive well, and the banks of a water-course are favourable.

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[*] *Nyctanthes*, *nyx*, night, and *anthos*, a flower, in allusion to its habit of opening its flowers at night.

[†] *Arbor-tristis*, sad tree, alluding to its opening flowers at night and casting them in the morning.

[‡] *Apocynaceæ*, from the genus *apocynum*, from *apo*, away, and *kyon*, a dog, adopted by Dioscorides because the plant was supposed to be poisonous to dogs.

[§] *Nerium*, from *neros*, wet, in allusion to the habitat of the plants.

[||] *Odorum*, perfumed.

After flowering the shoots that have flowered should be shortened to one-third their length and a free supply of manure dug in near the root. The best varieties may be budded on to common sorts during the rainy season, but layering is the best plan for propagating.

PLUMERIA[*] ACUTIFOLIA,[†] *Khair Champa*, and PLUMERIA ACUMINATA,[‡] *Son Champa*,

Are hardy small trees, in leaf only during the rainy season and bearing large sweet flowers, white with golden centre. The tree grows and looks well on raised mound or rock-work. Propagated by cuttings during hot season. While leafless during the cold season, large specimens may be transplanted without any soil about the roots with little danger of loss.

PLUMERIA ALBA[§]

Thrives under the same conditions as the last. It is a much scarcer tree, retains its leaves longer, and has pure white flowers.

TABERNÆMONTANA[||] CORONARIA, *Tagur*, *Bura tagur*, the double variety,

Are very choice white-flowered shrubs, thriving in any well drained and watered garden soil, and easily propagated by cuttings, planted in January or February.

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[*] *Plumeria*, in honour of Plumier, a celebrated French botanist.

[†] *Acutifolia*, sharp-leaved.

[‡] *Acuminata*, pointed.

[§] *Alba*, white.

[||] *Tabernæmontana*, in honour of Theodore, surnamed Tabernæmontanus, from the place in which he was born. *Coronaria*, crowned.

VINCA[*] ROSEA

Is a well-known undershrub, with rose-coloured or white flowers, propagated by seeds. It is hardy enough to spread freely when introduced into a garden.

VINCA MINOR[†] VARIEGATA.

In this climate a delicate little trailing plant with opposite, very short, petioled, entire, ovate leaves, brightly variegated with creamy white.

WRIGHTIA[‡] ZEYLONICA and WRIGHTIA ANTIDYSENTERICA[§]

Are shrubs with dichotomous branches, elliptical leaves, 3 to 5 by 1½ to 2 and puberulous white flowers 1½ inches in diameter, produced very abundantly during the hot season

WRIGHTIA COCCINEA.

A shrub resembling the above, but with brick-red flowers.

ROUPELLIA[‖] GRATA.

A stout climber attaining 20 feet, has opposite, entire, bright, shining, elliptical leaves and producing during the hot season terminal masses of pale rose-coloured flowers, 2½ inches in expansion and having a ring of processes arising from the thick corolla lobes.

CERBERA THEVETIA,[¶] *Velaitee Kuner.*

A shrub of rapid growth having narrow, linear, alternate leaves and bearing abundant yellow flowers at the ends of the branches. It is useful as a screen to shut out offensive objects or break the wind. Propagate from seed.

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[*] *Vinca* or *perivinca* was the old Latin name used by Pliny. *Rosea*, rose-coloured.

[†] *Minor*, smaller. *Variegata*, having different colours.

[‡] *Wrightia*, named after William Wright, a Scotch botanist. *Zeylonica*, from Ceylon.

[§] *Antidysenterica*, acting against dysentery.

[‖] *Roupellia*, named in honour of the Roupell family, encouragers of botany, *Grata*, agreeably-scented.

[¶] *Thevetia*, from the genus of the same name, in honour of Andrew Thevet, a French monk who travelled in Brazil.

CARISSA* CARANDA, *Kurwanda*, *Avinga*, *Kristna*, *Pakphala*, *Karumcha*.

A well known fruiting shrub, useful in wet districts as a fence and for its fruit. Is propagated from fresh seed.

ARDUINA BISPINOSA.

A pretty dwarf shrub resembling the *Kurwanda*, but having the spines twice-forked. It is a native of Natal, and may be propagated by half ripe cuttings under a bell glass or seed.

VALLARIS† HEYNEI.

A very pretty climbing shrub having opposite, elliptic or oblong, pellucid, dotted leaves, and pubescent cymes of white salver-shaped flowers 1 inch in expansion.

The under-noted are very desirable garden plants belonging to this order, which are cultivated in the same manner as the preceding:—

ALLAMANDA ‡ GRANDIFLORA.

A choice yellow-flowered climber, thriving when planted in a bed or large tub of rich well-drained soil. It improves the flowering if the branches are thinned out during the hot season, all weakly ones being removed and a supply of thoroughly decayed manure given. Propagate by layering of well-ripened branches. A very fine specimen of this plant may be seen at Kirkee on the eastward end of a house, where it is protected from the prevailing wind and exposed to the morning sun only.

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* *Carissa*, from the Sanskrit name. *Caranda* from the Marathi *Kurwanda*.

† *Vallaris*, perhaps from vallo, to enclose the plants are used for fencing in Java. *Heynei*, Heyne's

‡ *Allamanda*, from Allamand, a Surgeon who travelled in Guiana. *Grandiflora*, large-flowered.

The soil it is growing in is black loam, 18 inches in depth, overlaying decayed trap (locally called moorum), which provides good drainage, and a water-pipe near by ensures abundant water.

ALLAMANDA NERIIFOLIA.*

An erect glabrous shrub 3 feet in height, having opposite or whorled, oblong, acuminate leaves on short petioles, and deep golden yellow flowers, between funnel and bell shape, the tube being 1 inch in length. This plant thrives with ordinary border treatment and is propagated by cuttings and layers.

ADENIUM † OBESUM, *Nerium obesum.*

A remarkable plant, very rare in gardens, with a thick gouty stem rapidly diminishing to short stout branches, which, during the hot season, are gay with numerous, bright, rosy, Oleander-like flowers having very short stalks; during the rainy season oblong leathery leaves crowded at the ends of the branches appear. A fine specimen in the Poona Botanical Garden, which has been in cultivation over 20 years, is scarcely three feet in height.

This plant is a native of the sun-burnt rocks of Aden, and in the Deccan thrives with full exposure if planted in a mixture of good loam 1 part and crushed bricks 2 parts and carefully watered, giving a good soaking at intervals of 15 days or so during dry weather. Propagation is said to be easily effected from half ripe cuttings. It bears pods freely, but the seed rarely becomes mature.

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[*] *Neriifolia*, having leaves as in *nerium*.

[†] *Adenium*, from Aden, its natural habitat. *Obesum*, obese, referring to the swollen stem.

CERBERA* ODOLLAM.

A small tree native of salt swamps near the shore of various parts of India, but thriving in a great variety of soils at Calcutta, Lucknow, Poona, and Madras. Good specimens may be seen thriving in ordinary loam freely irrigated while the tree is young. The leaves are 3 to 8 by 1 to 2 inches, alternate, lanceolate, smooth, leathery with transverse, very slender nerves and narrowed into a short stout petiole and large cymes of pure white flowers 1 to 3 inches diameter succeeded by globular or egg-shaped fruit 3 inches in diameter containing a single seed.

This tree is much scarcer in gardens than it should be, probably owing to a difficulty in getting good seed.

BEAUMONTIA † GRANDIFLORA and BEAUMONTIA JERDONIANA

Are very fine climbing shrubs, producing large white flowers during the cold season. Any rich well-drained and watered soil is suitable. Propagate by layers.

AGANOSMA ‡ CARYOPHYLLATA, *Malati*, *Echites caryophyllata*,

Is a very grand climbing shrub; in a deep well-drained rich soil, it climbs over high trees, and produces a great profusion of very fine white flowers 2 inches in expansion during the rainy season. It is strange that this beautiful climber is so little grown because even when not in flower few plants equal it in beauty of foliage and it gives less trouble than many subjects which do not approach it in beauty. There is a very fine specimen at Poona growing on a made-up soil forming a terrace, so that drainage is perfect and there is a wate-rpipe near by from which it may get sufficient water. It is growing over large trees in a position fully exposed to the prevailing wind.

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* *Cerbera*, from Cerberus, the three-headed dog of Sartarus.

† *Beaumontia*, in honour of Mr. Beaumont, of Bretton Hall, Yorkshire. *Grandiflora*, large-flowered. *Jerdoni*, *Jerdon's*.

‡ *Aganosma*, from *aganos*, mild, and *osme*, smell, in allusion to the pleasant smell of the flowers. *Caryophyllata*, having leaves like the cinnamon tree.

Roxburgh has accurately described this plant as follows:—" Stem woody, as thick as a man's leg, bark dark rust-coloured, with fissures and scabrous sparks. Leaves opposite, short, petioled ovate, cordate, pointed, entire petioles; nerves and veins coloured red, cymes terminal, bracts falling, flowers numerous, large, pure white, delightfully fragrant, calyx five-leaved, leaflets lanceolate as long as the corolla, somewhat coloured; on the outside a little downy. Corolla tube 5-sided gibbous, segments of the border large triangular. Follicles cylindrical and spreading. Seeds a few, large crowned with down." The seeds are not often produced in southern districts, therefore it is propagated by layering.

ECHITES* NUTANS

Is in this climate a delicate but beautiful plant valued for its opposite, ovate, acuminate, pale pea green leaves having the midrib and nerves of a beautiful transparent red. It grows fairly in a pot with rich loam mixed with an equal quantity of pounded bricks and kept in bright light yet shaded from direct sunshine. It may be propagated by layers more easily than by other methods.

HOLARRHENA ANTIDYSENTERICA, *Koora, Kureya, Dowla, The Conessi Bark Tree, Vepallei kura.*

A very showy shrub with numerous creamy white flowers. This very interesting shrub is rarely seen in gardens: it is abundant on the Western Ghauts at Khandalla, and in a neglected garden at Poona a fine specimen may be seen blooming profusely during the hot season, which proves that the plant is not of a delicate habit, and when established would be a very desirable garden plant. It loses its leaves during the cold season, and in March bursts out with leaves of a most delicate pale green from 6 to 12 by 1½ to 5 inches, oblong, ovate in outline, and variable at the apex and base from sharp to rounded. The flowers are succeeded by pairs of terete follicles attaining 16 inches in length with a thickness of ¼ inch, usually coherent at the tips and enclosing brown seeds having a tuft of hairs at the end furthest from the footstalk. Propagation may be effected from seeds.

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* *Echites*, a viper, probably referring to the acrid nature of its sap. *Nutans*, nodding.

ASCLEPIDACEÆ.*

The Asclepiad Family.

A family much resembling the last, but distinguished by having the stamens cohering round the pistil and the pollen in masses joined in pairs. The cultivation required is very similar to the last, a deep well-drained soil being generally suitable. A distinct rest during the cold and early half of the hot season may be allowed with advantage. Propagation by seeds and layers.

STEPHANOTIS† FLORIBUNDA.‡

This very choice climber requires a rich loamy soil, which may be formed by mixing good garden soil one part, decayed leaves one part, and broken bricks or pots one part. If the soil does not contain abundance of lime, a small quantity taken from an old building can be used with advantage.

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* *Asclepidaceæ*, from the genus *asclepias*, the Greek name of *Æsculapius*.

† *Stephanotis*, *stephanos*, a crown, and *ous otis*, an ear.

‡ *Floribunda*, having many flowers.

Perfect drainage and regular watering, sufficient to keep the soil moist, is necessary. When fully exposed to the sun, the leaves of this plant sometimes become burned and unsightly; by planting it in a pit filled with the above compost this burning of the leaves is avoided.

PERGULARIA ODORATISSIMA, *Tonki, Kunja luta.*

A very choice climber having cordate acuminate soft downy leaves attaining 3 inches and umbels of greenish yellow exceedingly fragrant flowers. It enjoys a rich loamy soil kept open by a liberal admixture of broken bricks and slight shade.

CRYPTOSTEGIA* GRANDIFLORA†

Is a very hardy climber having opposite, elliptic, obtuse, leathery leaves and large, rosy, purple flowers by pairs of triangular follicles 5 inches in length, having abundant milky sap and seeds furnished with silky hairs.

CALOTROPIS‡ GIGANTEA, *Rui, Ak, Mandar.*

The white variety of this very common plant is well worthy of a place in gardens because some of the white flowers have as pure a colour as it is possible to find among flowers. White-flowered plants of this species are met with rarely over the great range of the common sort. When such a plant is found in fruit, a string should be tied round the fruit to prevent the seed from being blown away when ripe. In due season the seed may be gathered and sown in the garden on a loose stony soil. When the young seedlings appear, the stem near the ground should be examined and all that show a purple tinge pulled out, because such plants would produce the common purple variety. Plants having very pure white flowers may be propagated by layering.

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* *Cryptostegia*, *cryptos*, concealed, and *stego*, to cover; in reference to the scales in the throat covering the anthers.

† *Grandiflora*, large-flowered.

‡ *Calotropis*, beautifully twisted, in reference to the filaments of *Calotropis gigantea.*

HOYA CARNOSA.

A very choice climber, which thrives in a climate having extremes of moisture and drought. In the conservatory it enjoys running up a tree stem clinging by the aerial roots it sends out in abundance.

A suitable soil is one-half broken bricks and one-half rich loam.

The leaves are fleshy, oblong, pointed, and its thick wavy flowers are produced in axillary umbels. Propagation may be effected by cuttings and *leaves* inserted as cuttings.

HOYA GRIFFITHI,

A native of Eastern Bengal, has the thick, elliptical, entire leaves common in the genus and umbels of rosy-coloured flowers rather larger than *Hoya carnosa*. It is figured in the "Curtis's Botanical Magazine," Tab. 6877.

The following is a list of choice species and varieties of Hoya:—

AUSTRALIS.
ARNOTTIANA.
BELLA.
CARNOSA.
    ,, VARIEGATA.
CORONARIA.
CUMINGIANA.
GLOBULOSA.
GRIFFITHI.
IMPERIALIS.
LINEARIS.
MULTIFLORA.
PALLIDA.
PANCIFLORA.
PENDULA.
SHEPHERDI.
RETUSA.

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* ***Hoya***, named after Mr. Hoy, once gardener to the Duke of Northumberland at Sion House. *Carnosa*, fleshy.

STAPELIA[*] GRANDIFLORA.

A dwarf succulent plant having short four-angled leafless stems in groups and bearing brown, hairy flowers 3 inches in diameter with a fœtid odour. This plant thrives on a dry bank with little care.

GENTIANACEÆ,[†]

The Gentian Family,

Is a group of herbs with opposite entire leaves of bitter taste and a few water plants with alternate leaves. The family generally affects temperate climates, and in this country abounds in wet upland districts and in low damp spots in dry districts. Many plants of this family are annuals with showy flowers, which are difficult to cultivate owing to the very minute seed germinating irregularly and the degree of moisture necessary being unsuitable for other garden plants, but the water plants *Limnanthemum* are easily managed and are very satisfactory.

EXACUM [‡] TETRAGONUM.[§]

A very beautiful herb with a quadrangular stem, broadly lanceolate, five-nerved, sessile leaves, and a large panicle of four-lobed flowers of a full azure blue 1½ inches in expansion. More efforts to grow this charming herb in gardens are wanted: it may be managed by sowing the seed thinly on good loam in pots at the beginning of the rainy season and keeping the pots standing in saucers constantly full of water. In sowing such minute seeds as this plant gives it is advisable to soak the soil with water, then sow on the surface and cover with a thin coating of leaf-mould. If the pot is then left in a saucer of water little watering on the surface will be necessary until the seed has germinated.

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[*] *Stapelia*, named by Linnæus in honour of Stapel, an Amsterdam Physician.

[†] *Gentianaceæ*, from the genus *gentiana*, from *gentiane*, the old Greek name used by Dioscorides.

[‡] *Exacum*, *ex*, out of and *ago*, to drive.

[§] *Tetragonum*, four-angled.

EXACUM PEROTTETII[*]

Closely resembles the above, but is larger, the leaves are 5 to 7-nerved, and the cymes are crowded with large pale blue flowers. Cultivable as above.

EXACUM BICOLOR resembles *Exacum tetragonum*,

But is distinguished by the corolla lobes being white in the lower and azure blue on the upper half. Cultivate like *Exacum tetragonum*.

EXACUM PUMILE.[†]

A very beautiful herb rarely exceeding 6 inches in height with sessile, lanceolate, three-nerved leaves or with lower leaves one-nerved and very numerous purple blue flowers having four prominent yellow anthers. It may be cultivated as detailed for *Exacum tetragonum*.

LIMNANTHEMUM[‡] CRISTATUM [§]

· An aquatic herb with floating circular or elliptic leaves about 4 × 3 inches and dense bunches of white flowers, which appear to rise from the stalk of the leaf. The flowers are about 1 inch in expansion and each petal has a longitudinal wavy fold crest-like in the centre.

LIMNANTHEMUM INDICUM

Resembles the above but the flowers are larger, 1½ inches in expansion, and each corolla lobe has a rich fringe of delicate white hairs which render the flowers very attractive. This species is not as free-growing as the preceding. It is very abundant in a tank on the "table land" at Panchgunny and also in tanks at Calcutta, but in the Deccan *Limnanthemum cristatum*, which is not as desirable a garden plant, completely outruns it.

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[*] *Perottetii, Perottet's.*

[†] *Limnanthemum*, marsh flower

[‡] *Pumile*, dwarf.

[§] *Cristatum*, crested.

BORAGINEÆ,*

The Borage Family.

A group of herbs, shrubs, and trees with alternate, entire, hisped leaves and an infloresence curling downwards and inwards (a scorpioid cyme).

CORDIA† SEBESIANA.‡

A small tree native of Cuba with ovate, acute or elliptic, entire, hisped leaves 6 × 3 inches and large cymes of bright scarlet flowers produced at the ends of the branches during January to March in abundance followed by pure white fruits 1½ × ¾ inches. This very handsome plant is of easy culture in the open border. It may be reared from seeds sown while quite fresh. There are fifteen indigenous species of this genus—hardy trees or shrubs of little value in gardens.

BORAGO OFFICINALIS,§ *Borage.*

An herb with leaves of two forms: the lower or radical leaves ovate and attenuated at the base into a long stalk; the upper or cauline leaves are oblong, sessile, and the flowers blue, purple, or white, about ¾ inch in expansion, and in the Deccan produced abundantly from September till March. The herb is used for cooling and flavòuring wines—the former property it is said to possess through the presence of numerous crystals of nitrate of potash. In America it is considered an important plant in feeding bees, and Dr. Theodore Cooke grew it for that purpose at Poona, but did not find the bees remarkably fond of it.

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* *Boragineæ*, from the genus *borago*, derivation uncertain.

† *Cordia*, named by Plumier in honour of Cordius, a German botanist.

‡ *Sebestana*, having fruit like sebestans.

§ *Officinalis*, sold in shops.

HELIOTROPIUM[*] PERUVIANUM.[†]

A favourite garden undershrub producing abundant sweet-smelling flowers varying from white to dark purple. It thrives with special luxuriance at an altitude of 5,000 feet, but can be grown well nearly to sea level by sowing at the end of the rainy season. At low altitudes it is advisable to treat the plant as an annual, sowing after the rainy season in pots and transplanting when they have grown about five leaves.

A position protected from noonday and afternoon sun is desirable and sufficient water given to keep the soil moist. At altitudes over 2,000 feet it may be propagated my cuttings and grown with ordinary border treatment.

CONVOLVULACEÆ.

The Bindweed or Convolvulus Family.

A very familiar group of plants in Indian gardens, easily distinguished by their twining habit and brilliant wheel-shaped flowers, of pure white, blue, rose, purple, and intermediate shades, and alternate exstipulate leaves generally heart-shaped, but often toothed and otherwise divided. Any good garden soil is suitable, and being plants of rapid growth, a considerable supply of water during the growing season is desirable. Many are annuals, and should be propagated by seed, but several of the finest are natives of South America, and do not yield seed freely in this country, but are easily propagated by cuttings of ripe wood.

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[*] *Heliotropium*, turning to the sun.

[†] *Peruvianum*, from Peru.

IPOMŒA AQUATICA,* *Kulmi shah, Tooti kura.*

A very showy plant growing on the banks of ponds and sending its long stems across the water, where it accurately shows the direction of the prevailing wind. Its flowers are of a rich purple and its leaves long, pointed, and with expanding points at the base (halbert-shaped or hastate). The plant is perhaps more satisfactory when grown on 'damp soil, because it does not grow so fast and flowers more freely. The young shoots are eaten as a vegetable in the Concan.

IPOMŒA BILOBA,† *Ipomæa pes-capræ, Marayada vel, Marja vel.*

A very beautiful plant thriving on the seashore, where it creeps over rocks, lighting them up with its rosy purple flowers. Its leaves are deeply two-lobed and resemble faintly the impression of a goat's foot. It is not of rapid growth, and in the garden a moist exposed rockery suits it well.

IPOMŒA CAMPANULATA‡

Is a very strong-growing climber, living many years, and producing large bell-shaped flowers, pale rose at the mouth, deepening to dark crimson at the bottom, in great profusion during the cold season.

This very beautiful plant is indigenous to hilly tracts in Western India, and in January may be seen on the side of the railway between Belgaum and Londa in grand luxuriance.

IPOMŒA CARNEA,§

With large rose-coloured flowers. It is less of a climbing plant than many of its congeners, and may be treated as a shrub. Its rampant branches may be cut back to 6 inches after flowering. Easily propagated by cuttings.

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* *Aquatica*, connected with water.

† *Biloba*, two-lobed.

‡ *Campanulata*, like a little bell.

§ *Carnea*, flesh-like.

IPOMŒA EDULIS,[*] *Batatus edulis, Sweet potato, Ritulla, Kappa-kelengu, Shakur-kund, Aloo,*

Is a trailing plant, easily propagated by cuttings of the stem, planted at any time that ripe cuttings are procurable. The ground should be well manured and dug or ploughed, and laid out in ridges for irrigation. Cuttings usually 18 inches long are doubled up, and the middle portion inserted abouf five inches deep.

IPOMŒA GRANDIFLORA,[†] *The Moon Flower, Munda valli, Doodia kaline.*

A large climber with soft thorns on the stems, cordate, ovate, acute, entire, smooth leaves 3 to 6 inches and pure white circular flowers 3 to 4 inches in width, opening in the evening and fading next morning : the peduncle is club-shaped and supports a membranous fruit enclosing four large seeds, white, red, or black in colour. The fruit is sold as a vegetable in Bombay markets.

IPOMŒA[‡] HORSFALLIÆ.

An evergreen twiner from the West Indies. Its leaves are palmately divided into five lanceolate entire lobes with undulated margins. The flowers are of a rich glossy rose colour produced in dichotomous cymes on peduncles as long as the leaves. This plant is difficult to propagate in this country, and is not likely to become common. The method used in England is cuttings of short side-shoots in a brisk bottom heat.

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[*] *Edulis*, edible.

[†] *Grandiflora*, large-flowered.

[‡] *Ipomœa*, from its bindweed and *omoios*, similar.

IPOMŒA INSIGNIS

Has much the style of the above, but has smaller flowers, and seeds freely at Calcutta, therefore will soon become plentiful.

IPOMŒA LEARII*

Is an old established favourite, with large dark blue flowers becoming reddish as they fade. To keep this plant in good order, young shoots, which come up near the root, should be taken off with some roots and planted several together in fresh soil at least once yearly. These young plants will bloom a few months later, and the old ones may be removed as they become weak.

IPOMŒA PALMATA*

Is a very familiar plant to be seen covering fences at railway stations, and even the fronts of artillery park sheds may be seen decorated and inviting with its rich profusion of palmate leaves and purple or white flowers. Its cultivation is very easy in a loose soil with occasional watering. Cuttings may be planted at any time during moist or cold weather.

IPOMŒA PURPUREA, *Convolvulus major.*

The flowers of this annual climber are of every shade, from white to dark purple or crimson, and all are richly shaded. When grown over a bamboo trellised archway few plants are more showy. Seed may be sown in June in dry districts and in wet districts later in proportion to the rainfall; in very moist low-lying places it will be advisable to defer sowing until the beginning of December.

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* *Palmata*, having leaves divided as the finger of the hand.

IPOMŒA RUBRO* CÆRULEA.

A very fine species with large blue or white flowers. Propagation by seed, sown from June to August. When the seed of this species is sown a small proportion of the flowers come of a white colour; the remainder of a brilliant blue; the mixture is very beautiful, but if it is desirable to separate the white from the blue-flowered plants, the seedlings should be examined while young on the stem near to the first pair of leaves. If a bluish colour is seen at that part, the flowers will come blue; if a pale green colour is seen, the flowers will come white. The same fact occurs in *Calotropis gigantea* and doubtless in other plants which yield blue or white flowers.

IPOMŒA THOMSONIANA

Is thus described by Mr. Bull:—"A beautiful new species in habit much resembling the well-known *Ipomœa Horsfalliæ*, the flowers, however, which are borne in clusters, are pure white and much larger, being about three inches in diameter at the mouth. It has thick, fleshy leaves, and from its free-blooming character cannot fail to become one of the most popular and useful of stove-house climbers."

IPOMŒA TUBEROSA†

Is a climber of very rapid growth with large digitate leaves of a dark green and golden yellow flowers produced in great profusion during the cold season. This plant does not flower the first season after sowing, and it will kill any delicate tree it may be allowed to run over. It is propagated from seed.

IPOMŒA VITIFOLIA.‡

A climber having hairy, cordately, five-lobed leaves 2 to 6 inches in diameter and clear primrose yellow or sulphur-coloured flowers 2½ inches in expansion appearing during the cold season. This plant is abundant on the Western Ghauts from Vingorla southwards, and at Marmagao thrive on rocky soil near the sea.

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* *Rubro cœrulea*, reddish blue.

† *Tuberosa*, tuberous.

‡ *Vitifolia*, having leaves as in the vine.

ARGYREIA* ARGENTEA and ARGYREIA SPECIOSA†

Are two very strong climbers, growing rapidly in any ordinary soil. In gardens those climbers strangle any trees they are permitted to grow on; therefore they should be reserved for scraggy trees in open places. In both the leaves are large, heart-shaped, and with silvery hairs underneath, and the flowers rosy purple. In the former the fruit is brown, yellow, firm, globular, pointed, and fully exposed in the latter. They are enclosed in the enlarged calyx.

ARGYREIA CUNEATA.‡

A very beautiful plant native of hilly tracts in the Deccan climbing if in shade, otherwise shrubby. It has a short stalk, elliptic or obovate entire leaves, and deep tubular funnel-shaped bright purple flowers. In a dry open part of the garden with a deep stony soil this plant is very ornamental. If the seed is sown where the plant is wanted and watered during the first rainy season little more attention is required.

CONVOLVULUS§ ARVENSIS.||

Although a common weed in wheat fields in the Deccan this is a very beautiful plant suitable for growing in suspended pots or baskets, where its rose-coloured flowers 2 inches in width and hastate leaves are 1 to 3 inches in length fully

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* *Argyreia*, from *argyreios*, silvery.

† *Speciosa*, very beautiful.

‡ *Cuneata*, wedge-shaped.

§ *Convolvulus*, *convolvo*, to entwine.

|| *Arvensis*, found in fields.

displayed. Sow in September; the flowering season is from November to February.

EVOLVULUS[*] ALSINOIDES,[†] *Vishnoo krant.*

The blue varieties of this plant are very pretty and suitable for sowing on loose gravelly soil in places where water is scarce. The plant is abundant throughout dry districts, the colour of the flower varying from white to deep blue in size from ¼ to ⅓ inch.

JACQUEMONTIA[‡] VIOLACEÆ.

A blue-flowered perennial convolvulus of great beauty, suitable for covering a trellis or arbour and thriving with ordinary border treatment. It is propagated by seed and cuttings.

LAGENANDREA[§] MOLLISIMA.[‖]

A very strong climber from the Canary Islands: it lives many years and developes a thick stem of a pale ash colour and marked by deep furrows. The leaves are cordate, smooth, and about 4 by 3 inches. The flowers are produced in immense numbers in October; they are about the size of a rupee, of a pale dun colour, and appear to be the favourite haunts of bees. This plant makes itself at home in any loose rich soil in the Deccan and may be propagated by seed and cuttings.

PORANA VOLUBILIS.

Few plants excite more admiration than this does when seen in flower during September and October. Its small pure white flowers are produced in such large silvery pubescent panicles that at a distance they resemble a bush covered with snow and when cut for table make a charming ornament. The leaves are alternate 2½ by 1½ inches, heart-shaped or ovate and of a whitish green colour.

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[*] *Evolvulus*, from *evolvo*, to untwist, the plant does not entwine.

[†] *Alsinoides*, *alsine*-like.

[‡] *Jacquemontia*, named after Victor Jacquemont, a French naturalist.

[§] *Lagenandrea*, having softly hairy stamens.

[‖] *Mollisima*, very soft.

The plant may be propagated by cuttings and layers, and thrives in dry districts with ordinary border treatment.

RIVEA[*] HYPOCRATERIFORMIS, *Kalmiluta.*
Rivea bona-nox,[†] *The Good-night Flower.*

This charming night-blooming plant gets the former of the two names in the "Flora of British India," but to many readers the latter suggestive name will be preferable to the uncouth title which indicates untruthfully that the flower is shaped like a shallow bowl or saucer. The plant is a climbing shrub of slow growth, living several years, thriving in a dry stony soil, and adapted for a part of the garden where water is scarce. Its flowers open at dusk, are pure white, and the expanded part measures 2 inches in width or rather less than the length of the tubular part. Propagation may be effected by seeds sown near the root of a shrub with scanty foliage such as a young *babool* tree.

SOLANACEÆ.[‡]

The Potato Family.

This is a large group of herbaceous plants with a few of the members soft-wooded shrubs. As all are of rapid growth abundant manure applied to a soil thoroughly turned up and free watering are necessary to produce well developed plants.

Propagation is effected by seeds and by cuttings of tubers as in the potato.

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[*] *Rivea,* named after Auguste de la Rivea, a Physician of Geneva.

[†] *Bona-nox,* good-night.

[‡] *Solanaceæ,* from the genus *solanum,* the old Latin name used by Pliny.

SOLANUM TUBEROSUM, *The Potato, Batata.*

There is little difficulty in the cultivation of the potato in upland parts of this country, but unfortunately the proportion of suitable soil is comparatively small. The presence of a considerable quantity of nitrogen-yielding vegetable matter is necessary; this is produced in Europe, when not present in the soil naturally, by heavy dressings of farm-yard manure.

The soil should be turned up well and laid out in ridges 15 inches high and a heavy dressing of manure laid between the ridges. A small quantity of soil should be put on the top of the manure, the potato sets planted one foot apart, and the soil being levelled down will leave the sets about three inches below the surface. When the plants have grown about six inches draw the soil from between the lines up to the stems.

In dry weather irrigation once a week is necessary, and manure may be soaked in the irrigation water with advantage.

The planting season for gardens extends from the beginning to the end of the rains if the rainfall is not over thirty inches; where the rainfall is greater, it is necessary to defer planting till the greater part of the rainfall is over, and the system of planting must be modified somewhat by planting on the ridges instead of in trenches. Well-ripened potatoes must be used for seed. It is easy to distinguish a ripe potato; it has a thick, tough skin and begins to sprout freely when its growing season comes on. For "sets" the potato should be cut into pieces containing not more than two eyes each.

If the seed potatoes are small it is better to keep them whole, and to cut out the eyes till only two remain. Local varieties are of importance in potato cultivation. When fine sorts are brought from Europe or Australia success is rarely met with. We must raise improved varieties of our own instead of importing those of other countries. This may be done by letting the seed-pods ripen, sowing the seed and selecting any of the seedlings that are better than the parents.

LYCOPERSICUM* ESCULENTUM,† *Tomato, Wail-wangee.*

If the popular character of the tomato as beneficial in affections of the liver, indigestion, and diarrhœa is at all deserved, its cultivation in this country should be a great deal more extensive than it is; because, however mythical its virtues as a medicine may be, regarding its use as a salad and in sauce there can scarcely be two opinions.

By a little attention to the times of sowing, tomatoes may be had in good condition throughout the year. Any fair garden soil is suitable, provided water drains from it freely. Sowing should be made in seed-beds once monthly, and when a few inches high the young plants put out in lines three feet apart and the plants one foot apart in the line. During dry weather water freely twice a week, giving liquid manure at short intervals. When the plants have begun to grow, put in stakes and train the plants over them, tying them here and there slightly to give support. During the hot season, select a place for planting that is shaded at midday.

SOLANUM MELONGENA,‡ *Egg Plant, Wangee, Bengun, Brinjal.*

The English name of *Solanum melongena* is very apt when applied to the varieties resembling eggs that are grown as ornaments in European hot houses, but seems rather misplaced when applied to the vegetable commonly called "brinjal" or "bengun" in this country, the "aubergine" of the French. The brinjal is a favourite vegetable in use amongst all classes in

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[*] *Lycopersicum*, wolf peach.

[†] *Esculentun*, eatable.

[‡] *Melongena*, producing fruit like melons.

this country, and is in season throughout a great part of the year. There are many varieties distinguished by the shape and colour of the fruit, which ranges from white through yellow and red. Sow at intervals of one month from August to November in a seed-bed with rich loamy soil; when four inches high plant out eighteen inches apart in lines two feet apart; water thoroughly when newly transplanted, afterwards once a week. Give liquid manure frequently after fruit appears.

SOLANUM ARBOREUM.*

A large shrub or small tree of short life, with large leaves armed with spines. Flowers, when fresh, of a purple colour, but gradually changing to white, much resembling the flower of the potato, and fruit 2½ inches in diameter. This plant is very effective in the garden from its bold foliage and large flowers. A perfectly sheltered situation and a very rich soil with thorough drainage is necessary. Propagate by seeds sown during early monsoon months.

CAPSICUM† MINIMUM,‡ *The Bird's-eye Chillee, Dhan Lunka Mirich,*

Grows freely when the seed has been dropped near a wall or where there is building refuse in the soil, with heavy supplies of water at long intervals. It is deep-rooting, and should be sown where required to grow.

CAPSICUM FRUTESCENS§ and CAPSICUM GROSSUM,‖ *Kafree Mirich, Gach Mirich.*

The former is the common chillee, *mirchee*, and the latter a very large variety with mild fruit. Should be sown in August and September on a carefully prepared seed-bed and transplanted when about four inches high.

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* *Arboreum* tree-like.

† *Capsicum*, from *kapto*, to bite, from the biting taste of the fruit.

‡ *Minimum*, smallest § *Frutescens*, shrubby. ‖ *Grossum*, large.

Any fair garden soil enriched with manure is suitable. Water when transplanted and once in ten days afterwards is desirable until the fruit is nearly ripe. A variety of *mirchee* with pure white fruit is in cultivation at Kolhapur.

PHYSALIS[*] PERUVIANA, *The Cape Gooseberry,*

Enjoys alluvial soil or a reddish loam with much leaf mould. The seed should be sown during August in a thoroughly worked seed-bed, enriched with leaf mould. Care must be taken that the plants are not weakened by over-crowding. When about five inches high plant out one foot apart in lines eighteen inches apart, and water during dry weather enough to keep the soil moist.

CYPHOMANDRA BETACEA.

The usual amount of fuss has been made about the recent introduction of this plant. On the hills it has been found to succeed fairly, and bears a fruit that is useful in pies, as the common tomato is. On the plains it has often been raised from seed and grown to a good size, but the first monsoon cuts it off.

DATURA[†] ARBOREA,[‡] *Brugmansia candida.*

This grand shrub has elliptic oblong leaves with downy pubescense and tubular flowers 7 or 8 inches in length and about 4 inches wide at the mouth. It thrives well at 4,000 feet altitude. At Mahableshwar it is abundant on the road-sides and appears a special favourite of bees.

DATURA[§] STRAMONIUM and DATURA METALOIDES.

And other species are in this climate so weedy in habit that they need only to be mentioned here.

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[*] *Physalis*, a bladder, alluding to the inflated calyx.

[†] *Datura*, from the Sanskrit *dhastura*, a trumpet.

[‡] *Arborea*, tree-like.

[§] *Datura*, from the Arabic *dha*.

HYOSCYAMUS* NIGER, *The Henbane of England,*

Has been cultivated very successfully near Poona as a medicinal plant. It is called *pala-dawa* by the few mallees that are acqainted with it and the seed is procurable in drug shops in the bazaar under the name *khorasanee ajwan.* Such seed is generally old. Henbane may be sown at the beginning of September on a rich loamy soil heavily manured, thoroughly worked, and prepared for irrigation. In some instances, after the soil has been prepared, it is advisable to irrigate freely, then a day or so later the seed may be sown and another slight watering given. The seed will germinate in about ten days, and during the next 20 days the seedlings remain very small and apt to be destroyed by careless watering. Afterwards the plants begin to grow rapidly and need careful attention to thinning. This must be done gradually until the plants are 18 inches apart in the lines. During this period of rapid growth liberal supplies of liquid manure are desirable.

CESTRUM† ELEGANS, *Habrothamnus,*

A shrub with alternate, entire, ovate, lanceolate leaves and dense cymes of purplish red flowers produced at the ends of the branches during the four months at the end of the year. It is a fine border plant and easily propagated by cuttings.

CESTRUM AURANTIACUM.‡

A large shrub with alternate, entire, oval, undulated leaves having a very beautiful glossy sheen that appears to advantage on a table near a light. The flowers are tubular, 1 inch in length, and of a bright waxy orange shade, and are produced in great profusion during December.

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* *Hyoscyamus,* from *hyos kyamos,* hog's bean, the ancient Greek name used by Dioscorides. *Niger,* black.

† *Cestrum,* from *kestron,* an ancient Greek name. *Elegans,* elegant.

‡ *Aurantiacum,* orange-coloured.

BRUNSFELSIA* AMERICANA.

A free-flowering shrub, having alternate, obovate, elliptic, acuminate, petiolate leaves and funnel or salver-shaped flower having a long tube yellow and odorous when fresh, but gradually becoming white. It is easily propagated from seed, which occasionally it produces freely.

SCROPHULARINEÆ.†

A group of herbaceous plants or shrubs having showy irregular flowers, and enjoying cool moist positions in Indian gardens. Propagation is generally easy by seeds and cuttings.

RUSSELIA‡ JUNCEA

Is one of the most ornamental plants in Indian gardens. Its long rush-like stems with few leaves and bearing racemes of bright red tubular flowers 1 inch in length are very freely produced almost through the year when planted in a moist border. The most successful specimens are to be met with at an altitude of 2 to 3,000 feet with full exposure to the sun.

RUSSELIA ROTUNDIFOLIA and RUSSELIA FLORIBUNDA§

Have sessile, orbicular leaves deeply cordate at the base and crowded spikes of tubular red flowers. It thrives under the same condition as the above, but is not such a graceful plant.

TORENIA || ASIATICA.

A dwarf herb with ovate-cordate or lanceolate serrated leaves having short petioles and wide-mouthed flowers, of

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* *Brunsfelsia*, named after Otto Brunsfels, of Montz, who published in 153 the first good figures of plants.

† *Scrophularineæ*, from the genus *scrophularia*. Some of this genus hav roots with swellings like scrofula.

‡ *Russelia*, named after Alexander Russel, author of a Natural History Aleppo. *Juncea*, like a reed. § *Floribunda*, having many flowers.

|| *Torenia*, commemorative of Olef Toren, who discovered Torenia Asiatic in China. *Asiatica*, from Asia.

many shades of blue and violet, produced continuously for several months. It makes a pretty basket plant in a moist conservatory, and may be propagated from cuttings very easily.

TORENIA CONCOLOR*

Has pale purple or lilac flowers and otherwise resembles the above.

ANTIRRHINUM† MAJUS, *Snapdragon*.

A showy herb much grown in English gardens and thriving in cool districts of this country. It may be sown from the beginning of September till the end of November in pots of rich, loose soil, and planted out 6 inches apart in a bed as soon as large enough to be handled freely. It is advisable to treat it as an annual in this country.

MAURANDIA‡ BARCLAYANA.

A delicate climber that produces a nice effect on a trellis about 6 feet in height. In dry districts the seed may be sown at the beginning of the rains; in districts with heavy rains sowing must be deferred until the atmosphere is dry.

The leaves are cordate, acuminate, or hastate, and the flowers solitary, axillary, pale in the tube and with violet and purple shades on the lobes.

GESNERACEÆ,§

The Gesnera Family,

Is a small group of herbaceous plants having short underground stems (rhizomes) and giving brilliant flowers or rich coloured foliage. They thrive in shallow pots with a com-

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[*] *Concolor*, of one colour

[†] ***Antirrhinumu***, descriptive of the fruit, like a nose. *Majus*, large.

[‡] ***Maurandia***, named after Dr Maurandy, once Professor of Botany at Carthagena.

[§] ***Gesneracea***, from the genus *gesnera*, named in honour of Conrad Gesner of Zurich, a famous botanist, 1516-1565.

post of two parts leaf-mould, one part good loam, and one part sharp sand (not gravel) or broken bricks, with regular watering from May till October and partial or complete rest during the interval.

ACHIMENES.*

The roots (rhizomes) start into growth during May. As soon as the slightest indication of growth is seen, water the dried up soil and carefully shift the roots to fresh compost, planting about a dozen roots in a shallow pot. Water slightly at first, and as growth increases let more water be given. When up about six inches and the soil full of roots give weak liquid manure once a week. By the end of October, when the bloom will be past, gradually reduce the water and lay the plants aside in shade with a covering of straw. Propagate by dividing the rhizomes in May, or for new varieties, which it is necessary to increase rapidly, by planting well-grown leaves in sand during September-October.

NÆGELIA† ZEBRINA, *Gesnera Zebrina,*

Near Poona this plant is one of the richest ornaments the gardens possess. During May the roots start into growth, and should be planted separately in pots with the compost given under GESNERACEÆ; a pot eight inches in width an depth is fit for one root. Water gently at first, but when th pot is covered with leaves give one thorough watering dail and keep the plant in slight shade and in a place free fro dust. When the foliage is well developed it gives the riches velvety tints conceivable, and is followed by a raceme of brigh flame-coloured flowers. On a slightly shaded and sheltere raised bed with the plants put out eighteen inches apart

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[*] *Achimenes*, from *cheimaino*, to suffer from cold, in allusion to the gener tenderness of the species.

[†] *Nægelia*, after Carl Nægeli, a German botanist. *Zebrina*, striped.

beautiful effect is produced. To propagate slowly, divide the rhizomes at potting time ; for rapid propagation plant cuttings of the leaves, taking a part where two large veins meet for the base of the cutting, during September-October.

CENTROSOLENIA * BULLATA.

An herbaceous plant with sub-cordate, petiolate leaves having a very rough uneven surface, of a beautiful dark olive green of a bronzy shade above and vinous beneath. It is a common plant in conservatories where it appears to enjoy the moist equable atmosphere.

GLOXINIA.†

The garden varieties cultivated under this name belong to the genus *Ginningia* and are chiefly seedlings or hybrids raised from *Ginningia speciosa*. In India those plants are found only in the gardens of the rich, because bulbs cost a considerable sum in Europe. They are imported during the cold season and kept dry until April, then they should be potted in soil consisting of leaf mould one part and good sound loam two parts and sharp sand one part, and kept in a moist atmosphere and started by gentle watering. Flowers should come freely in July-August, and by October the plants should be gradually dried off and kept in a cool dry place during the remaining months until April. During the cold-season-resting much loss is met with, rats, damp, and drought have all to be contended with.

Propagation may be effected during October from cuttings of ripe leaves planted in fine sand in a frame. Young plants are easy to raise so far, but during the cold season decay sets in freely The most successful means of keeping the young plants is to plunge the cutting pots in dry sand in a frame with slight ventilation and very little water.

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* *Centrosolenia*, from *kentron*, a sharp point, and *solen*, a tube, referring to the form of the corolla. *Bullata*, having blistered-looking leaves.

† *Gloxinia*, named in honour of Benj. Petr Gloxin, of Colmar, a writer on botanical subjects

GLOXINIA MACULATA.*

A strong-growing species having the radical leaves heart-shaped, 6 × 4 inches, smooth and green above and reddish beneath, and the cauline leaves ovate. The stem is terminated by a raceme of large pale blue widely tubular flowers. In the Deccan this species grows well on a bank of rich soil regularly watered during the rainy season, and flowers profusely in October-November. Firminger says it is common at Calcutta, but difficult to flower in that climate.

BIGNONIACEÆ,†

The Trumpet flowers.

A small family, but including several very fine garden climbers, shrubs, and trees, generally distinguished by large, flat seed pods, which may be known from the pods of the Pea family by the presence of an internal partition, and winged seeds, usually flat. Large, white, or yellow, often malodorous, flowers prevail.

Many of the plants are adapted for a dry stony soil, and need little more water than nature provides in the dry districts of India, but a few large climbers, which are very useful for covering walls and thrive with full sun exposure, need regular watering.

Propagation is effected by seeds or cuttings.

Among climbers the best are —

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[*] *Maculata*, spotted.

[†] *Bignoniaceæ*, from the genus *bignonia*, so called by Tournefort, in compliment to the Abbe Bignon, librarian to Louis IV.

BIGNONIA ARGYREO[*] VIOLASCENS.

In the Deccan this proves a very grand climber and has a remarkable habit which renders its identification easy. When young the plant bears simple, ovate leaves and is of a rich violet colour, gradually changing to a pale green with white veins.

As the plant developes the peculiar colours disappear and the leaves become pinnate with two ovate leaflets and the midrib produced into a short, trifid, hooked clasp which enables the plant to lay hold of a rough wall exactly as in *Bignonia gracilis,* which is probably a variety of this plant. The flowers are orange-coloured and produced in great profusion in March, rarely succeeded by fruit, which is a Bignoniaceous capsule attaining 4 feet in length by ¾ inch in breadth and ⅛ inch in thickness.

BIGNONIA GRACILIS.†

A very beautiful climber, which clings to stone work by small hooked tendrils. Flowers bright yellow, produced in great profusion for a short time during the hot weather. This plant looks well planted against a house, and lends a charm to some buildings, at the same time keeping off some of the sun's heat. In planting a deep hole should be prepared and filled with good soil, decayed garden sweepings, and stones in equal parts. In a soil of this kind the plant will thrive even if the exposure is southerly.

BIGNONIA MAGNIFICA.‡

This grand species is of recent introduction to our gardens, and is sure to become a very popular plant. It is faithfully described by Mr. W. Bull as under :—

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* *Argyreo violascens*, silvery and violet coloured

† *Gracilis*, graceful.

‡ *Magnifica*, magnificent.

"A tree-growing plant, of scandent habit, introduced from the United States of Colombia. The flowers, which are produced in large branching panicles, are of great size (about 3½ inches across), and of an exceedingly attractive colour, ranging from delicate mauve to rich purplish crimson, relieved by a conspicuous throat of light primrose colour." As is usual in Bignonias the first leaves on a branch are simple and the succeeding leaves are compound, of two obovate leaflets attaining 4 × 2½ inches with the *rachis* (the midrib of a compound leaf) produced as a simple tendril 6 inches in length.

In the Deccan it flowers during the rainy season and may be propagated by layers and cuttings

BIGNONIA REGALIS*

Is thus described by Mr. W. Bull and it is sure to become popular soon.

"A very handsome stove climber, with opposite, elliptic, lanceolate leaves. The flowers are exceedingly beautiful, very large, and of a bright yellow and red colour. It has been recently imported from British Guiana, and is a decided acquisition to this beautiful genus.

TECOMA† JASMINOIDES‡

Is a very graceful climber and in flower almost throughout the year. It does not flower nicely in a pot or tub, but requires a deep stony soil.

TECOMA STANS.

A graceful hardy shrub with yellow flowers.

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* *Regalis*, royal.

† *Tecoma*, an abridgment of the Mexican name Tecomaxochitt.

‡ *Jasminoides*, like *Jasminum*, stems standing—the plant is an erect shrub.

TECOMA RADICANS.*

A shrubby plant with red flowers; it is apt to produce long trailing branches when in a rich soil.

MILLINGTONIA† HORTENSIS, *Cowla Nim.*

A very tall handsome tree, producing trumpet-shaped white odorous flowers during November to January; very hardy and ornamental as a road-side tree. This tree may be transplanted safely during November although of very large size.

DOLICHANDRONE FALCATA,‡ *Spathoidea*§ *falcata*,

Is a small tree suited for a rocky trap soil; its flowers are pure white, very graceful, but short-lived.

OROXYLUM‖ INDICUM, *Calosanthes Indica, Shyona, Vanga, Marum, Pampena.*

A small tree of rapid growth, producing compound leaves of great size, and flat pods about 2 feet long by four inches broad. Needs a rich soil.

KIGELIA PINNATA.

A small tree having opposite, pinnate leaves of about 8 very stiff obovate, elliptic leaflets, and in moist districts producing long pendulous racemes of large, dull, liver-coloured flowers. It grows very rapidly if planted on the margin of a tank in rich soil and is propagated by seed.

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* *Radicans*, rooting, alluding to the habit.

† *Millingtonia*, after Thomas Millington, an English botanist of the 18th century. *Hortensis*, of gardens.

‡ *Falcata*, curved like a sickle.

§ *Spathoidea*, descriptive of the spath-like calyx.

‖ *Oroxylum*, from *oros*, a mountain, *xylon*, wood, referring to the habitat.

¶ *Calosanthes*, a beautiful flower.

PEDALINEÆ,[*]

The Sesamum[†] *Family.*

Includes *Sesamum Indicum*, Gingelly, *Til*, or *Howra Til* A very important oil-seed. If sown near the beginning of the rains the plant is interesting and ornamental when in flower about September.

MARTYNIA[‡] DIANDRA.[§]

An annual plant of rapid growth bearing large, opposite, stalked, cordate leaves covered with soft clammy glands emitting a disagreeable smell and most beautiful flowers resembling the Foxglove and succeeded by large horny fruits provided with a pair of sharp recurved claws, which are evidently intended to assist in the distribution of the seed by laying hold of the fleece of sheep or some such animal.

The plant is called *Vichoo-acha-jhar* and the story goes that if a person is stung by a scorpion, one of those fruits ground to a paste and applied to the wound will cure it. No doubt this is literally correct if the person who is stung. does the grinding, because it is so hard that a considerable time will elapse and the pain of the sting go off about the time the paste is ready

ACANTHACEÆ

The Acanths.

A family including many very beautiful shrubs, a few choice climbers, *Thunbergia*, and some useful medicinal plants, *Karayet.*

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[*] *Pedalineæ*, from the genus *pedalium*, from *pedalion*, a rudder, in reference to the dilated angles of the fruit.

[†] *Sesamum*, from *sesamon*, an old Greek name used by Dioscorides.

[‡] *Martynia*, after John Martyn, F.R.S , 1699 1768, once Professor of Botany at Cambridge.

[§] *Diandra*, having two stamens.

All this family enjoy a soil well enriched with leaf mould, and the shrubby members are much improved by shade and moisture, as the range and variety of foliage colour extends from the almost white, *Fittonia argyroneura*, and the grey, *Eranthemum pallidum*, to the darker purple of *Graptophyllum hortensis*, many fine colour effects can be made with this family. All are easily propagated by cuttings. The above remarks apply to all the following:—

BARLERIA[*] CRISTATA VARIETIES, *Gokra*,

Are shrubs with beautiful fugaceous flowers, in colour pure white, rose, blue, and orange.

Eranthemum[†] *nervosum*, dark green foliage, bright blue flowers.

Eranthemum pallidum,[‡] pale grey marbled foliage.

Graptophyllum[§] *pictum*, green with bright yellow markings.

Graptophyllum hortensis, dark bronze coloured foliage.

Sanchezia[||] *nobilis*, veins bright yellow.

Fittonia[¶] *argyroneura*, a creeping under-shrub, with leaves veined with pure white, should be planted out in the conservatory with much leaf mould.

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[*] *Barleria*, named after J. Barrelier, a French botanist. *Cristata*, crested.

[†] *Eranthemum*, from *eran*, to love, and *anthemon*, a flower. *Nervosum*, in allusion to the white nerves of the bracts.

[‡] *Pallidum*, whitish.

[§] *Graptophyllum*, from *grapto*, to write, and *phyllum*, a leaf, referring to the markings on the leaves. *Pictum*, painted. || *Hortensis*, of gardens.

[||] *Sanchesia*, in honour of Josef Sanchez of Cadiz.

[¶] *Fittonia*, in honour of E. and S. M. Fitton, authors of "Conversations in Botany."

Fittonia Pearcei like the above, but with copper-coloured veins; treatment similar.

Aphelandra[*] *cristata*, *Cyrtanthera*[†] *aurantica*, and *Eranthemum bicolor* are all very beautiful plants of this family enjoying a rich moist soil and slight shade.

Meyenia erecta, with purple or white flowers, is a shrub of a hardy character, thriving with full sunshine.

Thunbergia[‡] *grandiflora*, an extensive climber with large lilac flowers of very easy culture. A rich soil with many stones mixed with it and a free supply of water is sufficient. Propagate by suckers.

Two varieties are cultivated, one with smooth leaves, which flowers when of small size, and another with rough hairy leaves, of more vigorous growth, and

Thunbergia Mysorense, syn *Hexacentris Mysorense*, are very beautiful climbing shrubs, giving flowers coloured yellow and maroon during December and January. In the Deccan it thrives when planted out on the north side of a house.

Thunbergia Kirkii, an under-shrub with leaves of a strange form, elliptical with a large tooth-like expansion on each side, and violet blue thimble-shaped flowers in pairs.

Thunbergia fragrans,[§] a small climber with a remotely hairy or smooth stem ; opposite, ovate or oblong, acute stalked leaves, having the base heart-shaped of or with two broad points hastate and producing pure white flowers attaining 3 inches in expansion, generally solitary, in the axils and on 1 to 3 inch stalks produced abundantly at the end of the rainy season.

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[*] *Aphelandra*, from *appelos*, simple, and *aner*, a male, the anthers being one-celled

[†] *Cyrtanthera*, from *khyrtos*, curved, and *anthos*, a flower, the flowers bend down from the summit of the scape *Aurantica*, golden

[‡] *Thunbergia*, named after C P Thunberg, of Upsala, 1748-1822

[§] *Fragrans* fragrant

This plant is abundant on the hills at an altitude of 3 to 4,000 feet. It is described by Dr. Anderson, from the pure white of its fragrant flowers, as the most charming of Bengal plants. In southern districts the variety *Vestita* with more hairy leaves and less perfume prevails. In gardens if seed is sown at the base of a shrub in an irrigated border it thrives well and is very pleasing.

Thunbergia alata resembles the above, except in having a deep yellow flower with a very deep purple spot in the centre; it becomes a weed in gardens.

Crossandra[*] *unduliæfolia*, a small shrub producing orange-coloured flowers ¾ inch in expansion on a one-sided spike. It is much grown by the Goanese.

Ruellia[†] *baikiei*, *Stephanophysum baikiei*, an under-shrub producing racemes of trumpet-shaped scarlet flowers from September to April.

Justicia[‡] *Gendarussa*,[§] *Tew*, *Jugut mudun*.—A favourite edging for a shady position.

VERBENACEÆ.[‖]

The Verbena Family.

This group of plants includes a few valuable timber trees *(Teak, Shevan)*; some very ornamental shrubs *(Clerodendron, Duranta)*; and a few choice herbaceous plants *(Verbena)*.

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[*] *Crossandra*, from *krossos*, a fringe, and *andross*, an anther, in reference to the anthers being fringed.

[†] *Ruellia*, in honour of John Ruelle of Soissons, 1474-1537.

[‡] *Justicia*, after J. Justice, a Scottish horticulturist.

[§] *Gendarussa* should be *Ghundharusa*, implying having juice of a disagreeable smell.

[‖] *Verbenaceæ*, from *verbena*, an old Latin name used by Virgil and Pliny.

The trees thrive on a reddish loam with heavy rainfall or irrigation during the rainy season. The shrubs also thrive on reddish loam, but require a liberal supply of vegetable matter in the soil, and the herbaceous plants still more vegetable matter in the form of well decomposed leaf mould.

Propagation is effected by cuttings and seeds. The seeds of trees in this family as a rule keep in good order several years, and take long to germinate.

TECTONA* GRANDIS, *Teak, Saag.*

This valuable timber tree can scarcely be called a garden plant, but is mentioned here because the young trees are often raised from seed in gardens and planted out as road-side trees. The seed should be collected during the hot season, mixed with a quantity of dead leaves, buried in a pit with a covering of at least six inches of soil, and kept in a moist state. On being opened at the beginning of the following rainy season the seed should be sown at once in ordinary beds covered with one inch of leaf mould and watered if the weather is dry. Germination will take place within six weeks, and the seedlings should be transplanted to nursery beds as soon as the first growth has become firm.

GMELINA† ARBOREA,‡ *Sevan, Shewan, Gumar, Gumbar, Goomadee, Hystrix.*

The seed of this tree may be treated as detailed for Teak, but large cuttings planted in August-September root freely.

GMELINA ASIATICA,§ *Gmelina parviflora,*‖ *Shieri goomoodoo.*

A hardy shrub having entire or three-lobed opposite leaves

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* *Tectona*, probably from Teka, the Canarese name. *Grandis*, large.

† *Gmelina*, in honour of Gottleib Gmelin, a German naturalist, 1743-1774.

‡ *Arborea*, tree-like.

§ *Asiatica*, from Asia.

‖ *Parviflora*, small-flowered.

½ to 1½ inches in length. When mature of a pale green beneath from a coat of minute round glands.

GMELINA HYSTRIX.[*]

A spinous shrub, scandent if shaded, having smooth, entire, elliptical leaves 3 × 1½ inches with scattered round glands and yellow flowers produced in long pendulous panicles consisting of small cymes enclosed in broad membranous bracts with purple veining.

CITHAREXYLON[†] SUBSERRATUM[‡]

As a garden tree is of very rapid growth on a sandy loam soil with free supply of water, and is easily propagated by cuttings.

CLERODENDRON.[§]

Many species of this genus are very handsome flowering shrubs, of easy culture in ordinary good garden soil, regularly watered and slightly shaded.

Clerodendron squamatum.[‖]—Flowers brilliant scarlet; propagate by seeds.

Clerodendron nutans.[¶]—Flowers white, drooping; propagate by suckers.

Clerodendron Thomsoni.[**]—Short climber; flowers scarlet and white. Propagate by cuttings in frame.

Clerodendron fragrans.[††]—Flowers double, very fragrant, leaves fœtid when bruised; propagate by suckers. Becomes a weed in good soil.

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[*] *Hystrix*, a porcupine, in allusion to its spines.

[†] *Citharexylon*, fiddle-wood.

[‡] *Subserratum*, slightly saw-toothed.

[§] *Clerodendron*, from *kleros*, chance, and *dendron*, a tree, said to be from its uncertain medicinal properties.

[‖] *Nutans*, nodding.

[¶] *Squamatum*, scaly.

[**] *Thomsoni*, Thomson's.

[††] *Fragrans*, fragrant.

Clerodendron siphonanthus.—With long tubular curved flowers in large panicles.

Clerodendron aculeatum.—With small, sweet-scented flowers and short thorns, a suitable plant for fences or toparian work.

Conjea azurea.—Delicate climber.

*Petræa** *volubilis.*—Very beautiful hardy climber.

Aloysia† *citriodora.*—Lemon-scented verbena.

Duranta‡ *Ellisii.*—Shrub ; beautiful white flowers.

Duranta Plumierii.—Shrub ; beautiful lilac flowers.

Are all choice garden plants requiring no special culture.

LANTANA.§

Cross-bred varieties of this genus introduced from German gardens are very brilliant and useful plants for the outer parts of the garden and on rocky places. The flowers varying from pure white to dark crimson are produced in great profusion. The pruning shears should be applied freely immediately after flowering to prevent seed from ripening and all seedling plants should be destroyed.

VERBENA.

The garden verbena may be sown any time between the beginning of the rainy and the end of the cold season. The soil must have abundant decayed leaf mould and old cowdung and should be frequently top-dressed with fresh compost as the plants spread.

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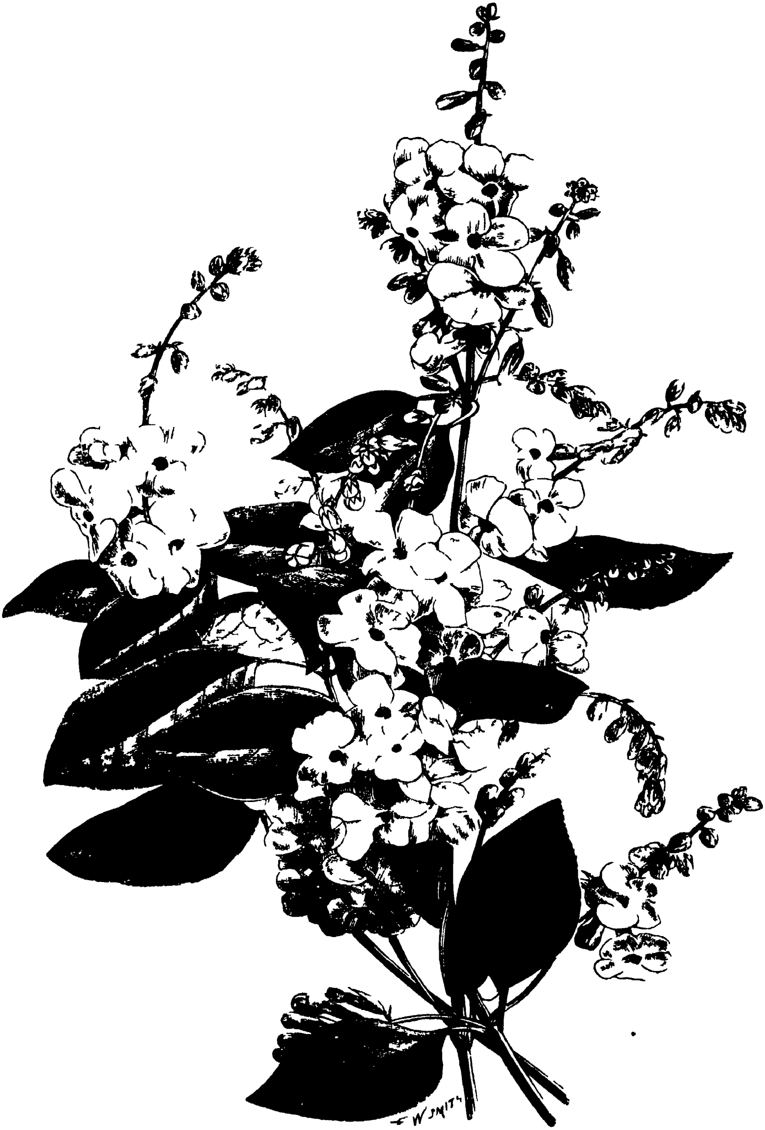
* *Petræa,* named after Robert James, Lord Petre, by Linnæus. *Volubilis,* climbing.

† *Aloysia,* in honour of Marie Louisa, mother of Ferdinand VII. of Spain. *Citriodora,* lemon-scented.

‡ *Duranta,* in honour of Castor Durantes, a botanist who died in 1590.

§ *Lantana,* an old Italian name for the way-faring tree.



DURANTA PLUMIERI ELLISIA.

Cuttings or layers may be used to propagate choice sorts, but seed will give more vigorous plants.

VERBENA CILIATA.*

A pretty little creeping annual with pinnate leaves and rosy flowers resembling the garden verbena, but smaller. It may be sown at the end of the rainy season and will be in flower during January-February. It often springs up from self-sown seeds.

OXERA PULCHELLA.†

A grand woody climber of New Caledonia with leaves 2 to 5 inches long, oblong, entire, or crenate, and pendulous flowers having a greenish white bell-shaped corolla two inches in length, is figured in the "Botanical Magazine." Tab. 6938. This fine climber is sure to be of easy culture in our climate, and we may look for its introduction soon.

LABIATEÆ,

The Mint Family,

Are herbs or shrubs with aromatic or malodorous leaves; for example toolsee (*Ocimum sanctum*), thyme, mint, and the showy *Coleus*.

The hard-wooded species enjoy a deep sandy soil; the soft-wooded kinds require the same soil as is given for the *Coleus*. All the species enjoy an equable state of moisture in the soil and are easily propagated by cuttings or division, but a few, such as thyme, yield seed freely, and propagation by seed is preferable.

COLEUS VARIETIES.

The cross-bred varieties of coleus that are now so numerous in gardens are well worth careful attention for the rich shades of colour they produce. At any season, if procurable, get cuttings of well ripened shoots with the buds in the leaf-axils still dormant. Make cuttings, including two eyes, plant in a mixture of sand and leaf mould, and keep in a cool place. When rooted well, transplant to beds or pots with a compost consisting of good loam, garden sweepings, and old cowdung in equal parts, which should be mixed and kept in a moist pit six months before it is wanted for use. Large pots with several plants are better than small pots with one. Exposure to early morning sun only gives the rich soft glow of colour desired.

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* *Ciliata*, having hairs on the margin.

† *Pulchella*, pretty.

The following are all garden plants of easy culture, grown for the aromatic principle peculiar to each. A deep sandy soil kept moist is suitable. Propagation is very easy by cuttings or division, and slight shade during the hot weather is necessary.

BASIL, *Ocimum basilicum*—Used in French cookery.

BENGAL SAGE, *Meriandra benghalensis*—Used for preventing insect attacks on cloth.

BORAGE, "Indian," *Coleus aromaticus*—Used in flavouring wines.

GURMAL, *Coleus barbatus*—Used in pickling.

HOREHOUND, *Ballota alba*—Used against coughs and asthma.

MARJORAM, *Marjorana hortensis*—Used in cookery.

MINT, *Mentha viridis*—Used in cookery.

PATCHOULI, *Pagostemon patchouli*—Used for preserving clothes from insects.

PEPPERMINT, *Mentha piperita*—Used as a stomachic, antispasmodic, and carminative.

ROSEMARY, *Rosmarinus officinalis*—Used in hair washes.

SAGE, *Salvia officinalis*—Used in cookery.

THYME, *Thymus vulgaris*—Used in cookery.

TOOLSEE, *Ocimum sanctum*—Used in religious ceremonies by Hindus.

COLEUS BARBATUS, *Gurmal.*

A small undershrub having opposite, softly hairy, notched, ovate, obtuse leaves and spikes of bright purple two-lipped flowers.

The plant is abundant on the hills in wet districts and is cultivated at Bassein for its fleshy roots, which are used in pickling.

It is grown from cuttings inserted during the rainy season in a bed of fine sandy soil, and when rooted planted out in lines one foot apart and six inches between the plants in the line. The soil is irrigated sufficiently to keep it moist. The roots are taken up and sent to market during the cold season.

SALVIA FARINACEA

From Texas, makes a very pretty bedding plant in the Deccan, as it bears its violet blue flowers in great profusion from September till May. It certainly would make a charming bedding plant at hill stations during Summer. The leaves are, lower ones, petiolate, 3 to 4 inches in length, ovate-lanceolate or ovate-obtuse, cuneate or rarely sub-cordate at base, serrate on slender petioles, upper ones, lanceolate or linear-lanceolate, sometimes entire; floral ones, subulate or ovate-lanceolate. The calyx is densely white tomentose, often tinged with violet. It is easily propagated by cuttings and division.

SALVIA INVOLUCRATA

Is also a useful bedding plant in the Deccan, but grows rather high, 3 to 4 feet. The calyx is often coloured rosy, *tubular, campanulate, viscous, corolla rosy,* 3 *to* 5 *times as long as the calyx, the tube swollen, the lips sub-equal,* pedicels nearly equalling the calyx, whorls nearly six flowers approximating, racemes spike-formed. It flowers abundantly at the end of the rainy season and is easily distinguished by the small bract-like leaves under the group of flowers being coloured nearly similar to the flowers. Easily propagated by cuttings.

NYCTAGINACEÆ*

A small group of herbaceous plants and shrubs, differing from those previously noted by only one of the floral envelopes being developed. It is called a perianth, and in its bright colour resembles the corolla. The most important garden genus is

BOUGAINVILLEA.†

Well known grand-flowering climbers, depending on the bright-coloured leaves appended to the flowers (bracts) for their beauty : a rich, thorughly drained, loamy, soil heavily irrigated at considerable intervals is all that is necessary to grow them. No pruning is necessary except to keep the plants within limits, and few plants are less subject to insect enemies. Propagation is effected most easily by layers.

BOUGAINVILLEA SPECTABILIS‡ is the strongest-growing.

BOUGAINVILLEA GLABRA§ is of comparatively weakly growth, but still strong enough for garden culture and without thorns.

BOUGAINVILLEA SPECIOSA|| has brick-red coloured bracts.

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* *Nyctaginaceæ*, from the genus *nyctanthes*, from *nix*, night, and *anthos*, a flower

† *Bougainvillea*, after De Bougainville, a French navigator.

‡ *Spectabilis* remarkable

§ *Glabra* smooth.

|| *Speciosa* beautiful

PISONIA[*] MORINDIFOLIA.[†]

A small tree with large, ovate, acuminate, entire, alternate leaves, which are remarkable for keeping green if in shade and becoming a pale yellow colour if fully exposed to the sun. In the loose open soil near to the foundation of a house this tree grows very freely; it is easily propagated by cuttings.

MIRABILIS[‡] JALAPA,[§] Marvel of Peru, *Gulabas.*

This splendid herbaceous plant needs a very rich well watered soil and is propagated from seed which should be collected from bright-coloured flowers only, which have been grown beyond the influence of the pollen of common sorts. Seed imported from Europe generally gives the finest flowers. The smell of the flowers of this plant is very disagreeable to people not accustomed to it.

AMARANTACEÆ.[||]

The Amaranth Family.

The members of this family that are cultivated in gardens form a group of herbaceous plants with very numerous small dry flowers, often of brilliant colours, which may be preserved in a dry state as everlasting flowers, and many are valuable esculents used as spinach.

A very rich friable soil with perfect drainage is necessary for their culture, therefore a liberal admixture of gravel and old manure will improve an ordinary soil.

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[*] *Pisonia,* in honour of William Piso of Amsterdam, an eminent writer on Natural History.

[†] *Morindifolia,* having leaves like *morinda.*

[‡] *Mirabilis,* wonderful.

[§] *Jalapa,* jalap—it was believed to be the source of that drug.

[||] *Amarantaceæ,* from the genus *amarantus,* from *a,* not, and *maraino,* to wither, in allusion to the flowers retaining their colour.

Although many plants in this family will thrive with only nature's watering, to induce the luxuriance necessary in esculents free watering is required.

AMARANTUS OLERACEUS,[*] *Sag, Mat, Pokala,*

Is one of the best herbs for use as spinach, procurable in the Deccan. By a little care in shading during hot, and sowing on raised beds during wet weather, it can be grown for use throughout the year.

Amarantus caudatus[†]—Tall, with pendulous flower spikes.

Amarantus tricolor[‡]—With leaves of several brilliant colours.

Amarantus salicifolius[§]—With long narrow drooping leaves.

Gomphrena globosa—Flower heads round, of white, crimson, and yellow colours, and

CELOSIA[‖] CRISTATA,[¶] *Cockscomb,*

Are all of easy culture on a gravelly soil well enriched with old cowdung, and should be sown in dry districts, during the early rainy months, in districts with heavy rainfall near the end of the rainy season.

CELOSIA ARGENTEA,[**] *Koordoo,*

Grows freely on dry barren ground and might be improved by cultivation. It is used by the poor as spinach.

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[*] *Oleraceus*, used as an herb for food.

[†] *Caudatus*, like a tail, referring to the manner the inflorescence hangs

[‡] *Tricolor*, of three-colours.

[§] *Salicifolius*, willow leaved

[‖] *Celosia*, from *kelos*, burnt, in reference to the appearance of the flowers of some species

[¶] *Cristata*, crested.

[**] *Argentea*, silvery

ALTERNANTHERA.*

Several species of this genus, of low growth and very bright coloured leaves, were introduced in our gardens some years ago, and one, *Alternanthera amabilis,* has become the favourite edging and is much employed in small beds. A rich friable soil with regular watering is required. The plant is propagated with the greatest ease by cuttings, which may be planted where the edging is wanted at any time from June to December. Three lines planted about three inches apart soon cover the intervening ground and form a fine broad margin which can be kept in excellent order by frequent clipping. The glowing crimson colour this plant takes on in the Deccan during July to September is very fine indeed. A grub often makes it unsightly at the opening of the monsoon for which no remedy has yet been discovered, but the plant soon recovers from its bed effects.

CHENOPODEACEÆ,†

The Beet Family,

Is a small group of herbaceous plants, including beet, a much valued root, yielding a good part of the sugar supply of Europe.

BETA‡ VULGARIS,§ *Beet.*

Any soil that produces good crops of vegetables is fit for growing this crop if thoroughly manured with decayed town sweepings or poudrette. If in the Deccan or other place where salt is scarce in the soil the dried fish manure is particularly suitable.

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* *Alternanthera*, in allusion to the anthers being alternately barren.

† *Chenopodaceæ*, from the genus *chenopodium*, from *chen*, a goose, and *pous*, a foot, in allusion to the shape of the leaves.

‡ *Beta*, from *bett*, the Celtic for red, in allusion to the colour of beet.

§ *Vulgaris*, common.

In the Deccan the seed can be sown with advantage at intervals of fifteen days from the beginning of April to the end of October. During hot weather a cool moist place must be selected for sowing seed, and the plants transplanted when about four inches high; but the best roots are obtained by sowing where the plant is wanted to finish its growth. Whether sown at once in the open ground or transplanted, the plants should be left twelve inches apart; this allows for the most forward to be gathered early, leaving room for the full development of the remainder.

In wet districts the rainy months should be avoided for sowing, but young plants can be got from the Deccan and planted out as soon as the heavy rain is over. Beet seed must be imported. If of good quality, transplanted; eight ounces will plant an acre; if dibbled where required to finish growth, twelve ounces will be necessary. The price of good market sorts in England is 6*d*. per oz.

ATRIPLEX[*] HORTENSIS,[†] *Chandenbatwa.*

During the dry season this plant is easily raised for use as Spinach by sowing in rich irrigated soil.

SPINACIA[‡] OLERACEA,[§] *Spinach*, *Paluck.*

May be grown in dry districts from June to January by providing a good rich soil thoroughly drained and watered freely. *Basella alba* and its red variety are climbers, requiring no special culture. The leaves may be used as Spinach.

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[*] *Atriplex*, from *a*, not, and *traphein*, to nourish.

[†] *Hortensis*, of gardens.

[‡] *Spinacia*, from *spina*, a prickle, in allusion to the spines on the fruit.

[§] *Oleracea*, used as an herb for food.

POLYGONACEÆ.*

The Buck-wheat Family.

This family includes the buck-wheat, *Fagopyrum*† *esculentum* Kootoo, several graceful river-side plants, and *Antigonon*‡ *leptopus*, a very beautiful climber, which is now common in every garden. This plant is of easy culture if seed or cuttings are planted on deep, well-drained, rich soil and a trellis provided for the plant to climb on. The roots are tuberous; therefore, when, after flowering freely from August to November, the foliage becomes dry and burnt up, water should be withheld and the stems cut down. During May fresh shoots will be thrown up with great vigour, and a free supply of manure and water should be given.

EUPHORBIACEÆ §

The Castor-oil Plant and Milk-bush Family,

Are trees, shrubs, or herbs with minute unisexual flowers, but a few are very showy garden plants, from the brilliant-coloured leaves surrounding the flowers (bracts, *Poinsettia*) and bright-coloured leaves (*Acalypha*, Croton). A deep stony but rich soil is generally suitable with abundant water during the growing season and a distinct season of rest in December and January is necessary.

A stiff soil and excess of water are particularly injurious· Propagation is effected by seeds and cuttings.

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* *Polygonaceæ*, from the genus *polygonum*, from *poly*, many, and *gonu*, knee joint, referring to the numerous joints of the stem.

† *Fagopyrum*, *phago*, to eat, and *pyros*, wheat.

‡ *Antigonum*, *anti*, against, and *gonum*, an angle.

§ *Euphorbiaceæ*, from the genus *euphorbia*, a name used by Dioscorides.—"This word means, literally, plenty of food, and seems a strange name to apply to a genus of plants that are for the most part poisonous, unless, indeed, on the principle that a little of it goes a long way. The derivation, we are told, is from Euphorbus, Physician to Juba, King of Mauritiana, who is said to have brought the plant into use."—ALCOCK.

EUPHORBIA PULCHERRIMA.

*Poinsettia** *pulcherrima.*

A rapid-growing shrub with small flowers surrounded by large scarlet leaves, "bracts," very magnificent during the cold season. Soil, two parts good garden soil, one part broken pots or bricks, one part old manure. Thorough drainage is necessary, and free watering while growing fast. A white and a double scarlet variety are in cultivation.

To make a very dwarf flowering *Poinsettia*, at the beginning of September cut a deep notch about six inches from the end of a branch; when the milky sap has dried up tie some leaf-mould in moss round the wound, roots will soon appear, then the little plant may be cut off, potted, and kept in a frame a few days.

EUPHORBIA SPLENDENS.

A thorny shrub, producing bright red flowers from January to March. The same treatment as *Poinsettia pulcherrima* is suitable.

ACALYPHA† WILKESIANA TRICOLOR.

This shrub has become extremely common, as it grows with little care under ordinary garden treatment, but it very rarely is seen in the condition it is capable of. When properly managed, its dark-red colour is wonderfully rich with glowing tints. It needs a deep very rich soil with numerous stones to secure thorough drainage, and a full supply of water from March to December. Numerous varieties are already in culti vation, among which the following are likely to retain a place in gardens:—

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* *Poinsettia*, in honour of Dr Poinsett *Pulcherrima*, very pretty.

† *Acalypha*, the Greek name for the nettle *a* privative, *kalos*, beaut *aphe*, touch—"Plants without beauty and with stinging properties." Gr ham's Catalogue of Bombay plants Evidently the name was not compoun ed in view of the favourite varieties of this day

Acalypha marginata[*]—With pale rose margin.

Acalypha brownii or *macrophylla*—Very large parti-coloured leaves.

Acalypha illustris[†]—With golden variegation.

Acalypha spiralis[‡] or *torta*—With curiously twisted brown leaves.

Acalypha obovata—With obovate leaves having a creamy margin, which ultimately becomes rosy crimson while the centre assumes bronze tints.

RICINUS COMMUNIS. *Castor-oil Plant, Yerendia.*

The large bright-coloured leaved varieties are very effective in gardens. The arrangement required for an effective display is a large bed made by mixing ordinary soil, stones, and decayed stable sweeping in equal proportions. The seed should be sown on the bed near the beginning of the rainy season. For watering it is advisable to sink a pot in the bed, with the hole stopped, and keep it filled with water. Such treatment will induce very luxuriant development, therefore the plants should be gradually thinned until 4 feet apart. The plants near the edge of the bed should be stopped by pinching out the central buds.

CODIÆUM[*] VARIEGATUM,[†] *Crotons of Gardens.*

A perfect rage for the cultivation of this plant prevailed a few years ago, which has now almost died out, but as some of the varieties are among the most beautiful shrubs we possess, the fever has been followed by steady care and attention.

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[*] *Marginata*, having a distinct margin.

[†] *Illustris*, brilliant.

[‡] *Spiralis*, spiral

[§] *Codiæum*, from *codebo*, the Malayan name of one of the species. *Variegatum*, variegated with various colours.

The soil necessary is one part good reddish friable loam, one part stable sweepings that have been thoroughly decomposed in a *moist* pit, one part old lime and broken bricks or potsherds. Generally, pots are advisable, but if the plants can be planted out in the above compost with perfect drainage and thin shade, the result is better. Protection from strong wind and direct sunshine is necessary for the large-leaved varieties, but fine plants of the small-leaved sorts may be seen planted out fully exposed to the sun. For surface dressing established plants dried fish is an excellent manure. Thrip is the chief insect enemy; it breeds very fast after the rainy months are over; therefore at this season the plants need constant attention. As a wash prepare one ounce soap dissolved in one gallon water and one ounce kerosine oil stirred in; wash with a rag or sponge; as the washing proceeds the mixture should be kept well stirred to prevent the oil from coming to the surface.

Different varieties of *Codiæum* may be easily grafted together by enarching, but no advantage is obtained by the practice.

Propagation as a rule is very easily effected. Many varieties may be rooted simply by placing the cuttings in water, which should be kept fresh by frequent renewal, but a few of the slow-growing varieties are difficult to root without all the arrangements detailed at page 57. On this subject a writer in the *Indian Agriculturist* gives some valuable hints, as follows :—

GRAFTING CUTTINGS

"This is undoubtedly one of the most useful methods of grafting, and is especially useful to the young practitioner, as it requires less skill and care to obtain a successful result than any other system. The process is simply to unite the two cuttings from their base, an inch or so upwards, by paring them down, so as to fit the two together and securing them in the position by tying before the cuttings are inserted. I have adopted this method extensively for the propagation of several of our weak-growing varieties of Crotons, such as *Roseo-picta*, *Mrs. Barron Chantrière*, and others of the same class. These varieties, when propagated as ordinary cuttings, frequently take from one to two months, or even longer, to root properly, but by splicing them on cuttings of *Maxima*, *Grande*, *Aucabæfolium*, or any other strong-growing kind, they not only root quickly, but their after-growth is invariably more vigorous than when on their own roots only."

Among the immense numbers of varieties to be found in nurserymen's catalogues many are mere "sports" or temporary variations and others have no claim to notice except novelty. The following are of genuine merit, and will retain a place in gardens:—

Codiæum andreanus—Leaves 12 × 4 inches, elliptic acuminate, ground colour dark bronze green, midrib and veins golden, becoming crimson when mature, habit upright.

Codiæum Dormanianus—Leaves 8 × 4 inches, slightly three-lobed, middle suffused with yellow, which becomes glowing crimsom.

Codiæum elegantissimus—Leaves 15 × 1½ inches, drooping, with reddish petioles and chrome yellow variegation, increasing towards the points.

Codiæum Gladstonii—Leaves 16 × 4 at the broadest part near the apex, but gradually receding towards the petiole, colour green with pale yellow patches or bands.

Codiæum interruptum—Leaves 15 × ¾ inches, many reduced to the midrib for a short space.

Codiæum Jacksonii—Leaves 15 × 1½ inches, dark bronze and green suffused with crimson.

Codiæum gloriosus—Leaves 24 × 1½ inches, drooping, margin undulated; green with much creamy yellow variegation, known as Princess of Wales.

Codiæum Kingianus—Leaves 15 × 6 inches, oblong, ovate, ground colour deep green, midrib and veins golden, with crimson blotching when mature.

Codiæum longifolium—Leaves 18 × ½ inch, pendulous green, midrib yellow. Young growth all bright yellow. An old favourite and a very beautiful plant.

Codiæum Lowii—Leaves 18 × 3 inches, linear acuminate, on stout foot stalks, dark green blotched with yellow and crimson. A very fine variety.

Codiæum maculata minor—Leaves 4 × 1½ inches, bright green with golden spots. A neat dwarf-growing sort.

Codiæum magnolifolia—Leaves 14 × 5 inches, colours, bright green with crimson midrib and primary veins.

Codiæum Mooreanus—Leaves 18 × 1½ inches, green with yellow midrib and many transverse yellow bars.

Codiæum multicolor—Leaves 9 inches in length, breadth very irregular, greatest at the apex and least at the middle, colours dark green, crimson and chrome in irregular shading.

Codiæum nitidum—Leaves 4 × ½ inch, often spirally twisted, green with yellow variegation. Young growth bright golden. An old but valuable sort, bearing full exposure to the sun when planted out.

Codiæum pictum—Leaves 4 × 1 inch, oval-pointed, dark green with yellow and crimson variegation. A very fine old variety.

Codiæum Princess of Wales—See *Gloriosus.*

Codiæum rex—A very fine sort, interesting from its variability. On some plants leaves representing many kinds may be seen.

Codiæum superbiens—Leaves 10 × 3 inches, oblong, green with clouded yellow markings; when mature veins and margin coppery picked out with crimson.

Codiæum triumphans—Leaves 12 × 3 inches, linear lanceolate; when mature, bronze green with crimson midrib.

Codiæum undulatum—Leaves 8 × 1½ inches, margin undulated. Young leaves pale green blotched with yellow, the green becoming dark bronze, the yellow bright crimson.

Codæum variabilis, leaves 8 × 2 inches, irregularly curved and clouded with chrome and glowing crimson; habit, branching vigorous.

Codiæum Veitchi—Leaves 10 × 2½ inches, ground colour pale green, veins and midrib broadly marked with chrome yellow, becoming crimson when mature.

Codiæum Williamsii—Leaves 10 × 3 inches, oblong, midrib, and veins yellow, becoming crimson.

Codiæum Youngii—Leaves 20 × 1½ inches, slightly pendulous, dark green with crimson midrib and blotches.

In the list of Mr. W. Bull, King's Road, Chelsea, London, the following are described :—

CROTON BROOMFIELDII.

A richly-marked golden variegated variety of great beauty. The leaves are nine or ten inches long, and about two and a half inches broad in the widest part. The green ground colour is very dark, but everywhere broken up by irregular yellow lines, spots and blotches. The midrib has a slight tint of red, with a yellow central band, and the margins are similarly tinted.

CROTON CRŒSUS

One of the series of Crotons or Codiæums with golden variegation. The leaves are bright green, with a yellow costa and freely blotched with bright yellow in irregular patches or freckled markings, occupying half or sometimes more than half the leaf surface.

CROTON EMINENS.

A dense-habited free-growing hybrid variety. The leaves are closely set, broadly lance-shaped, tapered at the apex to an acute point, they are of a bright glossy green, with an ivory-coloured midrib, and a portion of the lateral veins of the same colour. The contrast is very striking.

CROTON INCURRENS

A peculiar variety, which is characterised by its oblong stalked leaves having the midrib or costa excurrent in the form of a small horn near the apex of the leaf. The colours are green and yellow, very regularly disposed. A distinct and attractive plant.

CROTON FORMOSUS

A handsome hybrid variety of moderate growth. The leaf-stalks are crimson, the leaf-blade bright green, while the centre and principal veins are yellow, the surface being here and there sprinkled with yellow spots. These yellow portions take on at a later period a glowing crimson hue, the midrib and margin especially being of a bright magenta-crimson.

CROTON HEROICUS.

An attractive hybrid with green leaves freely marked with deep yellow, the central bar and the veins, and in many cases the half, or even the whole, of the leaf-surface being yellow, and this in some leaves flushed or lined with a tint of rosy crimson.

CROTON ILLUSTRIS.

A singularly grotesque-looking variety. The leaves are mostly three-lobed on purplish petioles, the lobes being twisted or curved, so as to acquire a sort of forked appearance. The colour is green, richly maculated with golden yellow, the central bar yellow, and the variegation irregularly distributed, so that sometimes the points are almost wholly golden.

CROTON INSIGNIS.

A fine form with long narrow foliage. The leaves are deep green, with the midrib and veins beautifully picked out with golden-yellow, the margins and midrib rosy crimson.

CROTON LINEARIS

A small-growing variety of remarkably neat habit. The leaves are from four to six inches long, linear, usually obtuse, but sometimes narrowed to the point, dark green, with a yellow midrib and a few lateral blotches of the same colour, occasionally almost wholly yellow.

CROTON ORNATUS

An attractive and distinct variety. The leaves deep green with a narrow central band of creamy yellow, and long parellel veins of the same colour, the surface being here and there marked by blotches of yellow, the yellow parts becoming tinged with crimson. In some conditions the lines and blotches are rosy pink, and the midrib of a deeper rosy crimson.

CROTON RECURVATUS.

An exceedingly pretty variety, remarkable for its elegantly recurved leaves. The stems are purplish and the petioles deep blood-crimson. The colouration is striking, there being a yellow central band with a crimson midrib, and yellow veins, the yellow being more or less suffused, so that it predominates over the green of the remaining parts.

CROTON RUBERRIMUS.

Probably the reddest of all the bright red varieties yet known. The leaves are narrow and elegantly drooping, in the young state they are green at the edge, with creamy yellow on each side the red costa, the green parts spotted with cream ; then the creamy parts become suffused with red, and the costa changes to a deep crimson, the yellow finally being replaced by deep rosy crimson.

CROTON SCEPTRE.

One of the ribbon-leaved forms of Croton. The colouring consists of a crimson costa, on each side of which comes the dark bottle-green ground colour, and added to this are irregular spots and a few patches of fiery orange with some spots of yellow.

CROTON VITTATUS.

A very handsome Croton of bold and striking habit. The colour of the leaf-blade is a clear full green, with a broad band of creamy yellow, which runs out laterally along the bases of the distant primary veins. The midrib in the older and more matured leaves takes on the same bright ruby-red as the petioles, which adds much to the brilliancy of the marking.

JATROPHA[*] MULTIFIDA,[†] *The Coral Plant*,

While young and thriving a very handsome plant with alternate digitate leaves and terminal corymbs of bright red flowers.

JATROPHA PANDURÆFOLIA.[‡]

A pretty shrub bearing fiddle-shaped leaves and bright crimson flowers in terminal corymbs. Unless it is pruned at the end of the rainy season it is apt to keep to a single stem, then it looks naked.

JATROPHA CURCAS and JATROPHA GOSSIPIFOLIA[§]

Are very free-growing shrubs suitable for rapidly hiding some unsightly objects and are propagated from seeds.

JATROPHA PODAGRIDA[‖]

Is a small shrub with a remarkable gouty stem, large peltate leaves, and small bright red flowers. It is often grown in conservatories, but thrives well on a bank of rich soil fully exposed to the sun and regularly watered.

MANIHOT[¶] UTILISSIMA,[**] *The Tapioca or Cassada Plant.*

This shrub was introduced many years ago, and is known among the people as the arrowroot plant, because the starch prepared from the root is used for the same purposes as *Arrowroot*, the starch from the underground stem of *Maranta arundinaceæ*. *Cassada*, would be a better common name for this soft-wooded milky shrub having alternate palm-

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[*] *Jatropha*, from *iatros*, a remedy, and *phago*, to eat—some of the species possess medicinal properties and are nutritious food.

[†] *Multifida*, much-divided.

[‡] *Panduræfolia*, having fiddle-shaped leaves.

[§] *Gossipifolia*, having leaves like the cotton plant.

[‖] *Podagrida* gouty, referring to its swollen stems.

[¶] *Manihot*, the Brazilian name of the genus.

[**] *Utilissima*, most useful.

ate leaves of 3 to 7 oblong, lanceolate, quite entire segments, small yellowish flowers rarely produced in this climate, and very thick cylindrical roots containing great abundance of starch. Two plants occupying four square yards of soil produced 45 lbs. weight of roots giving about 7 per cent of starch after growth during one year in a rich irrigated loamy soil at Poona.

A machine for rasping such pulpy roots to remove the starch is much wanted.

SECURINEGO* LEUCOPHYLLA.

A shrub of neat habit and easy culture, with small elliptical entire leaves, and very showy from the profusion of fruit of a pure white colour, which retains its fresh appearance a considerable time. Any good soil with free drainage is suitable.

ALEURITES† MOLUCCANA, *Akroot.*

A handsome evergreen tree with polymorphus leaves 4 to 12 inches in length on petioles 2 to 2½ inches in length and having two glands at the top. The small white flowers are succeeded by sub-globose, fleshy, smooth, olive-coloured fruit containing 1 or 2 large hard seeds rich in oil and with a furrowed testa, resembling a walnut. This tree is useful for avenues and public places in southern districts where it thrives with little care.

EXCÆCARIA‡ BICOLOR.

A handsome shrub having ovate, lanceolate, opposite leaves olive green on the upper and crimson on the lower side, and

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[*] *Securinego*, from *securis*, a hatchet, and *nego*, to refuse, in allusion to the hardness of the wood. *Leucophylla*, white-leaved.

[†] *Aleurites*, from *aleiar*, wheat flour, in allusion to the young shoots being covered with mealy powder.

[‡] *Excæcaria*, from *excæcare*, to blind, in allusion to the acrid juice of the plant. *Bicolor*, of two colours, referring to the leaves.

bearing minute flowers during the cold season. The treatment detailed under CROTONS suits it well.

PEDILANTHUS[*] TITHYMALOIDES,[†] *Valaytee Sher.*

This dwarf succulent undershrub forms a convenient edging adapted for a shady place in a deep open soil. It is propagated by inserting cuttings where it is to remain. A variegated variety found at Gunesh Khind in 1870 is a very showy bedding plant for loose sandy soil. Under the heading "EDGINGS" the name of this plant has been printed "Paradanthus" in error.

PUTRANJIVA[‡] ROXBURGHII,[§] *Putra-jan, Putra-jiva, Jewan-putr.*

A moderate-sized evergreen tree, having alternate, obliquely ovate, lanceolate, serrulate, smooth leaves, small yellow flowers, and globose or ovoid white tomentose fruit. It is of slow growth, thrives in a deep alluvial soil without irrigation, and is propagated by seed.

NEPENTHACEÆ.[‖]

The Pitcher Plant Family.

A small group of climbing undershrubs, native of the hottest and most humid regions of Southern Asia and remarkable for a wonderful prolongation of the midrib in the form of a pitcher, that secretes water in which flies are drowned and decomposed rapidly. Regarding this phenomenon Charles Darwin, after a long series of experiments, concluded that it was a special arrangement for a supply of nitrogen, and in this belief had many followers, but on this intricate subject a verdict of "Not proven" is more commonly accepted. The cultivation of *Nepenthes* in India is confined to districts where moisture and an equable temperature prevail. Inthe conservatories of the Calcutta Botanical Garden many specimens may be seen growing suspended from the roof in baskets of rich fibrous soil, which are watered twice daily during the growing season.

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[*] *Pedilanthus*, the slipper flower, in allusion to the shape of the flower.

[†] *Tithmaloides*, resembling the genus *Tithymalus*.

[‡] *Putranjiva*, *putra*, a son, and *jiva*, life. The nuts are strung round the necks of childern to preserve them in health.

[§] *Roxburghii*, in honour of W. Roxburgh, M.D., a famous botanist who worked in India.

[‖] *Nepenthaceæ*, from the genus *nepenthes*, an old Greek name used by Homer. The word means grief assuaging, and is used with reference to its supposed medicinal qualities.

The "Flora of British India" includes nine species, natives of the South of Ceylon, Khasia and Jyntea Mountains, Borneo, Sumatra, and the neighbouring islands.

ARISTOLOCHIACEÆ*

As typified by the genus

ARISTOLOCHIA,

Is a small family of herbs or shrubs, often climbing, with alternate, exstipulate, entire or 3 to 5-lobed leaves and bisexual flowers of strange shapes often resembling the head of a bird and generally of lurid colours. In some garden species a leaf from an undeveloped bud is conspicuous in the axil and resembles a stipule. The throat of the flower is furnished with numerous hairs pointing downwards and presenting no impediment to an insect going inwards, but on attempting to return the insect is met with an impassable barrier of hair points, which effectually impede egress and confine the insect to the neighbourhood of the stigma. The stamens adhere to the style and require insect aid to carry the pollen to the

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***Aristolochiaceæ*, from the genus *aristolochia*, from *aristos*, best, and *locheia*, parturition.

stigma. The fruit is a remarkable capsule resembling a balloon in form from the midribs of the six carpellary leaves being produced upwards and united in the stigma. The species in general cultivation are:—

ARISTOLOCHIA ORNITHOCEPHALA[*] and ARISTOLOCHIA RINGENS.

They grow rapidly in loose open soil, such as is found near the foundations of a house, flower freely in the cold season, and are propagated from seed cuttings or layers. The names, *Popat-wail*, Parrot-creeper, and Pitcher plant, are commonly misapplied to this genus.

ELÆAGNACEÆ.[†]

A small group of shrubs or trees remarkable for the brown or silvery scales which adorn their leaves rendering twigs of some of the plants very pretty objects for the decoration of apartments, because their beauty is retained after the leaves have dried up.

ELÆAGNUS LATIFOLIA.[‡]

A small bush or tree very variable in habit and given to climbing if in shade, branches spinescent, young ones bright silvery or rusty coloured, the leaves are usually alternate, 4 to 5 inches in length, ovate, oblong, or elliptic, or almost circular, silvery or bright rusty, red beneath. Flowers numerous, small pale yellow, fruit ¾ to 1½ inches in length, elliptic, eatable.

This shrub is easy of cultivation with ordinary border treatment and is propagated from seed or layers.

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[*] *Ornithocephala*, bird's head. *Ringens*, gaping.

[†] *Elæagnaceæ*, from the genus *elæagnus*, from *elaia*, the olive, and *agnos*, the chaste tree, in allusion, perhaps, to the combined resemblance to those trees.

[‡] *Latifolia*, broad-leaved.

URTICACEÆ.*

The Mulberry and Fig Family.

We have familiar examples of this family in the banyan, *Ficus Indica, Wud,* the cultivated fig, *Ficus carica, Anjeer,* and the mulberry, *Morus alba, Toot.* The flowers are very inconspicuous, and in the cultivated and wild figs are found a hollow flower stalk (peduncle) in the inside of what is popularly called the fruit in this instance.

FICUS† CARICA, *Fig, Anjeer.*

The fig needs a rich loamy soil with a considerable quantity of lime and thorough *drainage.* Plants are easily raised from cuttings of one year old wood planted in a shady bed in February and transplanted to their permament quarters at the beginning of the rainy season. The distance apart varies from 10 to 12 feet. At first one vigorous shoot should be encouraged to grow straight up, and when it has formed eighteen inches of well ripened wood it may be cut back to that height and encouraged to send up three or four branches. When these have made one foot of ripened wood they should be shortened and encouraged to branch again; all weakly shoots must be cut out completely, and any disposition to overcrowd prevented. The shoots resulting from the last pruning may be encouraged to grow up and ripen fruit; when grown about eight feet and the fruit ripened, it is advisable to cut back nearly to the base.

By this system of forming the tree at first no fruit is obtained the first year, but heavier crops may be gathered afterwards and in the meanwhile the ground should be occupied with vegetable crops. Water should be given freely when the soil is dry up to about the end of January, earlier or later according to the condition of the fruit. If watering is too long continued or more than is necessary is given the fruit becomes insipid.

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* *Urticaceæ,* from the genus *urtica,* from *uro,* to burn, in reference to the stinging properties.

† *Ficus,* a fig, derivation doubtful *Carica,* carian.

When the fruit is full grown it is necessary to protect each one separately until it is ripe. A pair of small baskets held face to face by a skewer and string are often used. In the jail garden at Baroda small perforated tin boxes are used, the lid and the box being of equal size and a slit cut in each to fit the stalk, the box hangs by the stalk of the fruit.

The fig differs from the majority of fruits in being a hollowed out stalk enclosing, while unripe, a large number of minute flowers and ultimately numerous small fruits, of which each may contain a solitary seed.

FICUS BENGALENSIS,* *Wud.*

It is sometimes necessary to raise this tree from seed in gardens, and as the necessary treatment differs from that given to other seeds it may be noted here. If the seed is sown in ordinary soil it rarely germinates, but if sown in a pot on a mixture of equal parts crushed bricks and leaf mould and the pot kept in a moist place the seed germinates freely. The seedlings grow rapidly and make more upright trees than cuttings make.

FICUS RELIGIOSA,† *Pepul.*

The seed of the *Pepul* may be sown as detailed above for the *wud*. It is more easy to rear than *wud* and often germinates in pots containing other plants that may be near to a Pepul tree. Cuttings do not root freely, but large trees may be transplanted with little trouble during the cold season, although the greater part of the roots may be cut off.

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* *Bengalensis*, from Bengal.

† *Religiosa*, connected with religion.

FICUS ROXBURGHII.*

A spreading tree having alternate, cordate, slightly acuminate, entire leaves on young plants attaining 15 by 10 inches. It thrives with ordinary border treatment in a very moist climate and is propagated by cuttings.

FICUS ELASTICA.†

The sap of this fine Burmese tree collected by making a cut through the bark and dried by exposure to the air in thin layers forms India-rubber or caouchouc. In cultivation it needs a moist climate, and may be propagated by cuttings planted in a frame and kept close. This tree is grown to a large extent in England in houses consisting of a wooden frame work filled in with glass and heated by causing hot water to flow from a boiler through pipes in the house and back to the boiler, a constant circulation being maintained in cold weather. If the temperature inside the house is kept as high as the shade temperature of Bombay the place is called a "stove," and if kept at a temperature not less than 40° F. the structure is called a "greenhouse."

FICUS MYSORENSE‡

Has a general aspect similar to the *wud* or banyan tree, but is distinguisded by the leaves and young shoots being heavily clothed in woolly hairs of a coppery tint.

FICUS STIPULATA,§ *Ficus repens*, *Ficus scandens*.

This is the favourite plant for covering walls at Calcutta, filling the office that is given to *Bignonia gracilis* in the Deccan. It has small, alternate, short-stalked, ovate, entire, harsh leaves and stipules in opposite pairs, not dropping as soon as the leaf is fully developed. The branches cling to stems of trees and walls by abundant rootlets. It thrives in a moist climate and is easily propagated by cuttings.

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* *Roxburgh*, in honour of W. Roxburgh, M.D., author of the *Flora Indica*.

† *Elastica*, alluding to the elastic gum, caouchouc, obtained from it.

‡ *Mysorense*, from Mysore.

§ *Stipulata*, referring to the prominent stipules.

FICUS VOLUBILE.

A pretty shrub of Western India, having elliptic, acuminate, oblique leaves with ten veins alternating on each side of the midrib and between the veins groups of small white spots. The fruit is in pairs, produced in great abundance, ¼ inch in diameter, suspended by a stalk ½ inch in length, of an orange colour, deepening into red as it ripens.

If grown in shade in a moist climate the plant twines, but more frequently is a shrub or small tree of sprawling habit.

LAPORTEA* SCHOMBURGHII VERSICOLOR.

A shrub with large, alternate, stipulate leaves on fleshy purple stalks and irregularly mottled with patches of creamy white. This plant grows rapidly and looks very showy under conservatory treatment in moist districts. It bears stinging hairs, which cause severe pain during a long time. Several of the mallees in the Calcutta Botanical Garden have undergone a disagreeable experience in connection with it, therefore it may be advisable to let other people know it. It is easy to propagate by cuttings.

PELLIONIA† DAVEAUANA.

A charming creeping plant suitable for a suspended basket or rock-work. Its leaves are alternate, stipulate, ½ to 2¼ inches in length, oblique, roundish, elliptic, of a dark bronzy olive green tinted with violet and marked by a broad central irregular band of bright green. It does well in rich loam kept open by a liberal mixture of cocoanut fibre. Very fine plants may be seen in Mr. Bromley's hands at Mahim, where the climate is moist and equable.

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* *Laportea*, name by Gaudichaud in honour of his friend M. Laporte.

† *Pellionia*, in honour of A. M. J. Alphonse Pellion, an officer of Freycinet's Voyage round the World.

PELLIONIA PULCHRA*

Differs from the above in the upper surface of the leaves being dull blackish along the midrib and veins.

PILEA† MICROPHYLLA.‡

A small herbaceous plant with minute orbicular opposite leaves and forming little fruits, which open with a sharp cracking sound, hence the popular name pistol or artillery plant. It is a West Indian weed and has maintained itself in the moist woods at Mahim during many years. In conservatories it propagates itself freely. A species or variety with leaves ¼ inch in width is also in cultivation.

CONOCEPHALUS§ ROXBURGHII.

A shrub with large, alternate, stipulate, ovate, entire leaves and minute, whitish, sweet-scented flowers in small heads produced during the cold season. If planted in a rich soil with shelter and frequent watering this plant grows rapidly, producing long trailing branches. It is easily propagated by cuttings.

ARTOCARPUS INCISA,‖ *The Bread-fruit Tree.*

This tree is a striking garden ornament in the Concan and other districts having a very humid atmosphere and equable temperature; inland it proves very delicate. It requires a rich loamy soil and should be propagated by suckers from approved trees. Seedlings are found to vary greatly, many of them being not worth growing as fruit trees.

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* *Pulchra*, beautiful.

† *Pilea*, from *pilos*, a cap, alluding to the shape of the perianth segments.

‡ *Microphylla*, small-leaved.

§ *Conocephalus*, *konos*, a cone, and *kephalos*, a head, the head of flowers are cone-shaped in some of the species.

‖ *Incisa*, cut, referring to the leaves.

ARTOCARPUS[*] INTEGRIFOLIA,[†] *Jack Fruit*, *Phunnus*,

Enjoys a reddish loamy soil, rich in vegetable matter, with heavy rainfall or irrigation, and is raised from seeds. The fruit is produced from the stem and larger branches, and often from a part of the stem that is covered with earth, making another example of underground flowering, such as is described under COMMELINA.

CONIFERÆ[‡]

The Cypress and Pine Family.

This family is represented in our gardens by the Cypress tree, *Cupressus glauca*, *Siroo*, and by Australian species of *Araucaria*.

A deep, loamy, well-drained soil with moving water at a depth of six feet are the conditions these trees enjoy; but if drainage is good they thrive with a rocky bottom if the soil is more than two feet deep and water is liberally supplied from the surface. Propagation is effected by seeds and cuttings—the former should be preferred, as the plants have a more handsome form. *Araucaria* seed does not bear the voyage, therefore plants must be imported. Although cuttings of this tree strike root easily, the plants do not take the tree-like form.

ARAUCARIA.[§]

The following species of *Araucaria* thrive in gardens in India when planted on a deep, loamy, well-drained soil regularly watered and enriched by surface dressings of thoroughly decayed manure. Fresh or badly fermented manure is very injurious if applied near the roots.

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[*] *Artocarpus*, *artos*, bread, and *carpos*, fruit.

[†] *Integrifolia*, entire-leaved.

[‡] *Coniferæ*, cone-bearing plants, from the shape of the fruit.

[§] *Araucaria*, from *araucanos*, its name in Chili.

If cultivated in pots, slight shade is desirable during the hot season. Cuttings strike root very easily in a frame, but good plants are very seldom raised by that method. As the seed carries very badly, young trees are imported from Australia.

*Araucaria excelsa**— Is in this climate the handsomest species. Its branches have a graceful feathery appearance.

Araucaria Cookii—Resembles the last, but of more irregular outline.

Araucaria Cunninghamii—Is of very rapid growth and needs much protection from the prevailing wind; its whorls of branches are often 4 feet apart.

Araucaria Bidwillii—Has triangular leaves about one inch in length. This is a delicate species in the plains in India, but thrives well in a cool conservatory.

CUPRESSUS.

Any rich garden soil well drained and watered regularly suits this genus when planted in the Deccan. The moist climate of the Concan appears unfavourable Propagation is effected by cuttings or seeds collected in Northern India. Cuttings taken from the ends of branches and planted in sandy soil in October strike root freely.

As fruit is not produced in Western India, the varieties are not well defined, and the following list is only approximate:—

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* *Excelsa*, tall.

† *Cupressus*, from *kuo*, to produce, and *parisos*, equal, with reference to the symmetrical growth of *Cupressus sempervirens*.

Cupressus glauca,[*] *Suroo*—Of very upright habit, with numerous short branches covering the stem.

Cupressus sempervirens[†]—Foliage dark green, branches few and strong, forming an acute angle with the stem.

Cupressus horizontalis[‡]—Foliage pale green, branches numerous, spreading horizontally, rising at the points. The tree has a conical outline.

Cupressus funibris[§]—Foliage dark green; large branches ascending, the smaller pendulous.

AGATHIS ALBA, *Dammara alba.*

In the Botanical Garden at Calcutta this has grown to a graceful tree. The soil is deep alluvium. This genus is propagated by fresh seed and cuttings.

Thuya[‖] *orientalis*—Forms a large spreading bush when it has room.

Juniperus[¶] *Chinensis*[**]—A dwarf conical bluish green shrub of slow growth.

Juniperus communis[††]—A procumbent shrub.

Pinus[‡‡] *longifolia*[§§]—With very long needle-like leaves, is interesting as only one of the genus which lives in Western India, but it does not thrive; at Calcutta it grows fairly.

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[*] *Glauca*, pale green.

[†] *Sempervirens*, evergreen.

[‡] *Horizontalis*, horizontal branched.

[§] *Funibris*, funereal.

[‖] *Thuva*, from *Thuia*, the old Greek name used by Theophrastus.

[¶] *Juniperus*, the old Latin name used by Virgil and Pliny.

[**] *Chinensis*, from China.

[††] *Communis*, common.

[‡‡] *Pinus*, the old Latin name used by Virgil.

[§§] *Longifolia*, long-leaved.

***Frenela cupressiodes*—Forms a very graceful shrub if treated as *Cupressus*.**

CYCADACEÆ:*

A group of plants having large pinnate leaves surmounting a stout stem and greatly resembling palms in general aspect, but by the character of the fructification more closely allied to *Conifers*. "The female plants bear in the centre of the crown of leaves surmounting the stem a tuft of woolly pinnately cleft leaves on whose margins the naked or uncoverd ovules are placed."—MASTERS.

A rich loam with perfect drainage and water at short intervals suits those plants well. Propagation is chiefly effected by large bulb-like buds which appear at intervals on the stem and grow freely when taken off and planted in well-drained soil in a moist shady place.

The sexes are on separate trees and occasionally the female produces fertile seeds. Transplantation during the cold season may be effected without risk. Graceful specimens, *Cycas circinalis*, are to be met with in moist forests of Southern India. To remove those plants to a garden at a distance it is advisable to cut off the leaves, and after clearing away as much soil as is practicable to cut down the stem and pack it tightly in its own leaves, taking special care to protect the terminal bud. If this work is done during the cold season the stem will bear careful transport during two months without danger.

CYCAS CIRCINALIS†

Is of noble aspect with leaves of 5 to 8 feet in length having falcate pinnæ from 6 to 9 inches in length dark shining green above and paler below.

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* *Cycadaceæ*, from the genus *Cycas*, from the Greek name for a palm.

† *Circinalis*, crook-leaved

CYCAS REVOLUTA[*]

Is of dwarf habit with leaves much smaller than the above and curved inwards at the point.

ZAMIA[†] HORRIDA

Is a dwarf species having the pinnæ lanceolate-acute, of a pale green and with spiny teeth on the outside.

MACROZAMIA[‡] CYLINDRICA

From Queensland has a long-necked stem and dark green coriaceous leaves; the pinnæ are glossy on the surface, each being marked at the base with a large ivory white patch, which strongly contrasts with the dark green midrib which lies between the two rows of ivory markings.

MACROZAMIA MACKENZII

From Queensland. The leaves are ovate in outline, with numerous pairs of narrow tempering segments of a dark green colour and nine to ten inches in length. The rachis is strongly convex behind, slightly so in front with the segments of the central portion set on at about half an inch apart, the upper ones being more closely, the lower ones more distantly placed.

MACROZAMIA PLUMOSA.

From a small ovate stem, the scales of which are woolly, rise the erect spirally-twisted leaves which have a flattened petiole. These leaves are furnished nearly to the base with narrow linear leaflets, which are set on at intervals of about a quarter of an inch and are from six to eight inches long.

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[*] *Revoluta*, rolled back.

[†] *Zamia*, from *semia*, loss or damage.

[‡] *Macrozamia*, the long zamia. *Cylindrica*, cylindrical.

MONOCOTYLEDONS,

One-Seed Leaf Class.

The botanical characteristics of this class are given at page 118. The cultivation, as a rule, is much more easy than among *Dicotyledons* because bulbous and tuberous plants prevail in it, and the root is fibrous without the tap root common in the broad-leaved division. The roots being fibrous and not penetrating to a great depth, necessitates extra preparation of the soil, so as to render it throughly friable and to intermix the manure perfectly. Among the bulbous or tuberous plants a season of complete rest is necessary, which may be obtained by withholding water. When the growing season returns the bulb or tuber will generally show signs of growth and should be narrowly watched, as fresh potting or transplanting can be most effectually performed at this time. The bulb or tuber contains a supply of food on which the fresh growth draws for a short time, but soon new roots are sent out, and to obtain good development the roots should have a supply of soil that has not been exhausted by previous growth, to draw sustenance from, hence the necessity of transplanting or repotting at or before the beginning of the growing season.

Grafting is unknown in this class, because the fibro-vascular bundles are separate and appear as a number of fibres which may be seen in the stem of a sugarcane or in an ordinary cane walking-stick, or the stem of a palm tree ; at a certain period, each of those fibres is growing at a point near its centre called the cambium, but the living period is limited. In the broad-leaved trees, such as the mango or the orange, those fibres are represented by very numerous thin wedge-shaped plates, which are arranged side by side around the central pith and the cambium points of all the plates coincide so that the cambium forms a continuous, very thin layer enveloping the stem, every branch, and every root of the tree, and separating the bark from the wood. In consequence of this formation, when an oblique cut is made on a branch, an elliptical ring of cambium is exposed, and it being possible to bring two such rings into contact and keep the parts fresh for a time union takes place at this ring and a graft effected. This is not practicable with the class of plants that follows, but as cuttings generally strike root freely there is little necessity for grafting.

ORCHIDACEÆ, *Orchids.*

In India we have some beautiful species of this charming tribe of plants growing profusely in the jungles. Hilly districts where at least 100 inches of rain fall during the short monsoon season seem to be their favourite home.

The greater number of beautiful orchids are called epiphytal plants, as they live upon other plants, not by drawing nourishment from the sap of their hosts, as true parasites do, but by clinging to the bark and taking shelter. The nourishment required is taken from the air, water, and probably the rain trickling over the decayed bark of the tree dissolves and brings with it some of the mineral matter the tree had abstracted from the soil, or which is carried there as dust and the dung of birds.

About a month before the monsoon sets in is the most suitable time to get orchids from the jungle. In collecting the plants, great care should be taken to have the roots unbroken, as they take a long time to recover, and meanwhile make no progress. When removed to a dry climate, they should be planted in pots having large holes in the sides to admit air, and filled with pieces of wood and charcoal, with a few decayed leaves and moss. Hanging baskets made of wooden spars are also excellent, and even wire baskets are suitable if plentifully supplied with moss and pieces of wood; but the roots of orchids and of all other plants do not enjoy close proximity to such a rapid conductor of heat as wire.

Anything that will impede the free passage of water or air should not be put into the pots or hanging baskets. During the growing season, that is, from the beginning to the end of the monsoon, water should be given freely twice daily, and towards the cold season gradually reduced until by January it has reached twice a week, at which rate the watering should remain until the monsoon again comes round. Shade from midday sunshine only is desirable, and the shade should be of a nature that will admit diffused light freely, such as the leaves of a thin tree. Of artificial shades, the common cocoa fibre matting is the best, as it is cool and yet light and airy.

There are some very fine terrestrial orchids that are found growing in soil like other plants, and a free well-drained loam, with about one-fourth part leaf-mould, will be found a suitable compost to grow them in. If taken from a jungle, they should be transplanted with a large ball of earth, as a slight disturbance of the roots may cause the death of the plant, though not for some weeks after transplanting; meanwhile the plant will continue growing from the store of sustenance laid up in its tubers, and the loss may be attributed to some other cause. One of the most beautiful of terrestrial orchids is

ANŒCTOCHILUS* SETACEUS,†

A charming little plant with the leaves bronzed and netted with gold. This plant is found on the Neilgherries and in

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* *Anæctochilus*, from *anoiktos*, open, and *cheilos*, a lip, in reference to the spreading apex of the lip.

† *Setaceus*, bristly.

Ceylon. It thrives well in a small pot with a mixture of yellow loam and leaf-mould, having the small pot placed in the centre of a larger one, surrounded with coarse gravel, the gravel covered with moss and a bell-glass. Water should be given to the soil in the pot once in two days during the rainy season when the plant is growing, and the surrounding moss should be sprinkled with water daily; but during the dry season water at the root and on the moss once a week is sufficient.

In connection with orchids a few special terms are used which it may be advisable to define :—

Epiphytal.—Adhering to, and growing upon, but not drawing nourishment from, other plants.

Caudicle.—The small stalk to which the pollen masses are attached.

Column.—The combination of stamen and pistil found in the centre of the flower, having one anther on the top (except *Cypripedium*) and the stigma on the front.

Lip.—A part of the orchid flowers which hangs downwards. It is usually of a different colour from the remainder of the flower and generally having more showy tints. It is believed to be formed from the combination of the two stamens and one petal that are wanting .in orchids, except in the section CYPRIPEDIEÆ. Its purpose evidently is to attack insects as it leads directly to the honey sac.

Pollinium.—A mass of cohering pollen grains.

Pseudo-bulb.—A swollen part at the base of the stem of many orchids.

Rostellum.—The beak of the anther cover.

Terrestrial.—Growing on the ground, in contradistinction from orchids that grow on trees.

FERTILIZATION OF ORCHIDS.

In Europe one of the chief recommendations of foreign orchids is the long time the plants remain in bloom. The cause of this is.—The stamens and pistils of orchids are joined together *(gynandrous)*, forming a body called a column; the pollen is collected in masses *(pollinia)*, similar to such as may be seen in the *ak* or *ruee (Calotropis gigantca)*, and occupies a solitary anther which surmounts the column or two lateral anthers in *Cypripedium*. The stigma may be recognised as a glistening hollow spot on the front of the column, a little below the terminal anther. This remarkable structure renders extraneous aid necessary for the pollen to reach the stigma except in rare cases. To bring the required aid, honey is stored in a sac at the base of the column or the spur, so that a bee sucking the honey may bring its head into contact with the point of the anther cover *(rostellum)* and push it off, laying bare the pollen masses, which in many instances are furnished with an elastic stalk *(caudicle)* bearing a viscid disc presented at the front, so that on being touched it adheres to the head of the insect and is carried off to the next flower the bee visits. There the mass of pollen comes in contact with the viscid stigma and is left adhering when the bee flies away. Very often a particular species of bee or some other insect is required for this work; therefore, when the plants are taken far from their native haunts the special insect is not available, and the flower remains fully open and waiting for fertilisation; from the same reason native orchids in India being soon fertilised retain their beauty only a short time, and in fact in some cases the flowers do not open as fully in India as the same kinds do in other countries.

ÆRIDES[*]

Epiphytes having long fleshy deeply channelled leaves arranged in two rows and variously toothed at the apex: the toothing is generally constant in each species and serves for identification. In a few species the leaves are terete (the shape of a pencil) and the majority have handsome flowers. Among the fine sorts are

ÆRIDES AFFINE.

Flowers rose, on branching spikes, sometimes 2 feet in length, sepals and petals equal, rounded at the apex, the lip sharply rhomboid, 3-lobed with a short spur; leaves light green, about 1 ft. in length. *Ærides affine,* variety *superbum,* has richer coloured flowers and a more compact habit.

ÆRIDES CRISPUM[†]

Has flowers white, suffused with purplish rose, nearly 2 inches in diameter, sepals and petals ovate-acute; lip three-lobed, the middle being very large, toothed at the base and fringed at the margin, leaves 4 to 5 inches in length, deep green, broad, flat, and unequally two-lobed at the apex.

ÆRIDES CRISPUM LINDLEYANUM[‡]

Is a robust variety, sepals and petals white, lip large, bright rose colour.

ÆRIDES ODORATUM[§]

Sepals and petals creamy white, tipped with pink, lip cuculate with even side lobes, the middle lobe being ovate and inflexed; the spur conical and incurved, the same colour as the sepals, very fragrant, leaves oblique, obtuse, mucronate at the apex and dark green.

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[*] *Ærides,* from *aer,* air, in reference to the power the species have of deriving their sustenance from the atmosphere.

[†] *Crispum,* curled.

[‡] *Lindleyanum,* Lindley's.

[§] *Odoratum,* fragrant.

BLETIA[*] HYACINTHINA.[†]

A terrestrial orchid having lanceolate, folded, erect leaves 1 foot in length, from small pseudo-bulbs and bearing purple flowers in profuse racemes standing well above the leaves. It needs abundant water during the growing season and a short supply while at rest.

BLETIA SHEPHERDII[‡]

Resembles the above, but is distinguished by a yellow line in the centre of the lip.

CALANTHE.[§]

Terrestrial orchids having large-ribbed and many-plaited leaves, with few exceptions evergreen, and producing long spikes bearing many flowers distinguished by the spurred lip attached to the column and light waxy pollen masses adhering to a separate gland.

CALANTHE VESTITA[‖]

Is deciduous and thrives well on a raised bank of rich soil slightly shaded; it produces its pure white flowers in a nodding spike during the cold season.

CATTLEYA.[¶]

A genus of magnificent evergreen orchids having pseudo-bulbs bearing one, two, or rarely three leaves. The species which produce the finest flowers have only one leaf on each pseudo-bulb. The flower scape rises from the top of the pseudo-bulb and bears a few flowers of large size, rich colours, and having four pollinia.

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[*] *Bletia*, in honour of Don Louise Blet, a Spanish botanist.

[†] *Hyacinthina*, Hyacinth-like.

[‡] *Shepherdii*, Shepherd's.

[§] *Calanthe*, from *kalos*, beautiful, and anthos, a flower.

[‖] *Vestita*, clothed.

[¶] *Cattleya*, named in honour of William Cattley, Esq., of Barnet, Herts, a famous patron of botany and one of the most ardent collectors of rare plants of his day.

Several species are cultivated with great success at Calcutta in well-sheltered conservatories kept moist by continual damping of the floors and stages. Suspended shallow pans containing a mixture of cocoanut fibre, moss, and sand with very carefully arranged drainage are used and water is given by the watering pot rather than the syringe in order to avoid the retention of water by the sheathing scales which envelope the young growth.

The following descriptions are from the catalogue of Mr. Chatterjee, of the Victoria Nursery, Calcutta:—

CATTLEYA GIGAS.

This is undoubtedly one of the finest Cattleya known, its flowers being amongst the largest and the most beautifully coloured, measuring seven to eight inches broad and nine to ten inches deep. The flowers are very handsome, the sepals and petals pale rose, and the lip large and broad, of a rich deep purple or violet in front, and having a large, yellow eye-like blotch on each side of the throat. It is a native of New Grenada. *Price Rs.* 10 *each.*

CATTLEYA MENDELLI.

A very fine species from Columbia; the flowers are very handsome, the sepals and petals are large and broad, varying in colour from white to a light pink, and the lip is large and rich magenta colour. This is undoubtedly one of the finest introductions. *Price Rs.* 10 *each.*

CATTLEYA PERCIVALIANA.

This distinct novelty is a native of Columbia. It is a plant that varies very much. The sepals and petals are deep blush, the lip much fringed, intense magenta-crimson, margined with blush-pink; the throat richly marked with crimson and golden yellow lines. It flowers well in this country· *Price Rs.* 10 *each.*

CATTLEYA SPECIOSISIMA.

This is a very handsome variety. Native of Venezuela. The stems are oblong and deeply channelled, each having an ovate, shining leaf; flowers very large, measuring 8 inches across, bearing two or three flowers together in a short spike. Sepals and petals broad, soft flesh colour, changing to mauve with age. It is a gem amongst Cattleyas, and flowers freely in this country. *Price Rs.* 15 *each.*

CATTLEYA WARNERI.

One of the finest of all Cattleyas. Native of Brazil. The flowers are large, more than six inches across; the sepals, and petals of beautiful rose colour, the lip large of a rich crimson, and finely fringed. *Price Rs.* 15 *each.*

CŒLOGYNE.*

Epiphytal pseudo-bulbous orchids having large coloured membranous flowers with converging and slightly spreading sepals, petals of like nature, but narrower, a great cucullate lip usually bearing fringes on its veins and a broad membranous column.

CŒLOGYNE CORRUGATA†

Has sepals and petals pure white with a yellow plate in front and veined with orange; racemes are erect and shorter than the leaves.

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* *Cœlogyne*, from *koilos*, hollow, and *gyne*, female, in reference to the female part or pistil.

† *Corrugata*, wrinkled.

CŒLOGYNE CRISTATA*

Has the sepals and petals snow-white; the lip white with a large blotch of yellow in the centre, the veins being ornamented with a golden crest-like fringe, the leaves twin, narrow, leathery, dark-green on oblong smooth pseudo-bulbs.

CŒLOGYNE ODORATISSIMA†

Is pure white, excepting the centre of the lip, where it is stained with yellow, the raceme is slender, pendulous, the leaves twin, pale-green, lanceolate, about 4 inches in length.

CYMBIDIUM.‡

The natural habitat of this genus is clefts in trees and such places where there is an accumulation of dead leaves, therefore it is intermediate in character between terrestrial and epiphytal orchids, and needs a soil consisting of rough loam, pieces of bark, and broken pots in equal parts. The pot should have a large hole in the bottom and be hung up or stood on a pillar.

CYMBIDIUM ALOIFOLIUM§

Has large flowers of a rich purple, with a long, almost black, strip down the centre; the spikes are sometimes 4 feet in length and drooping.

CYMBIDIUM EBURNEUM||

Has its flower spikes upright, its sepals ivory white, petals and lip stained with pale yellow.

CYMBIDIUM PENDULUM¶

Has the sepals and petals brown, lip red, stripped with white, racemes drooping, attaining 2 feet in length, many-flowered, leaves long, narrow, erect, leathery, dark green.

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* *Cristata*, crested. † *Odoratissima*, very sweet-scented.

‡ *Cymbidium*, from *kymbe*, a boat, referring to a hollow recess in the lip.

§ *Aloifolium*, aloe-leaved. || *Eburneum*, ivory.

¶ *Pendulum*, hanging.

CYPRIPEDIUM,* *Lady's Slipper,*

Are terrestrial orchids having two lateral stamens and the labellum forming a large inflated pouch and the pollen immersed in a viscid fluid. The plants thrive in rough loam and leaf-mould or decaying wood in ordinary pots well drained and kept in a cool moist place.

CYPRIPEDIUM VENUSTUM†

Has short, spreading, dark, bluish green leaves, mottled and blotched with paler green and pale purple on the lower side, and solitary flowers having the sepals and petals greenish white or pink striped with bright green, the petals fringed; the lip yellowish green. It flowers freely during the cold season.

DENDROBIUM,‡

This variable genus is easily cultivated in suspended spar baskets containing pieces of charcoal and half-decayed leaves in equal proportions and covered with moss. Regular heavy watering during the rainy season and a distinct rest in a cool moist atmosphere during the cold season are suitable. The leaves nearly all are ovate, elliptic, pointed, and generally, produced on long slender stems.

DENDROBIUM AGGREGATUM§

Has deep yellow flowers borne in arching racemes six inches in length during the hot season. Pseudo-bulbs are thick, deep green, and bearing a solitary leaf. The plant without the flowers is 3 to 4 inches in height.

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* *Cypripedium*, from *kypris*, Venus, and *podium*, a slipper, lady's slipper.

† *Venustum*, handsome.

‡ *Dendrobium*, from *dendron*, a tree, and *bios*, life; the species are epiphytal in their native habitats.

§ *Aggregatum*, clustered.

DENDROBIUM ALBO-SANGUINEUM[*]

Has soft creamy white flowers about 4 inches across porduced in twos or threes during the hot season; petals are twice as broad as the sepals, white with a few blood-red streaks at the base; labellum with a large reddish crimson blotch in the middle; the pseudo-bulbs are from a few inches to one foot in length and nearly 1 inch in diameter.

DENDROBIUM AQUEUM[†]

Has creamy white flowers, solitary or in pairs, rising from the axils of the leaves at the end of the rainy season; lip recurved from the middle, ovate, rhomboid, obscurely 3-lobed, two lateral small lobes, the intermediate one triangular; the lower half has an elevated ridge and under its termination a depression and that part has a deep yellow blotch; the underside smooth, the upper downy and striated, the margin of the terminal lobe fringed with soft hairs; the leaves are in two ranks, ovate, the upper smaller and lance-shaped, all very thin, suddenly pointed and striped with longitudinal nerves; stem stout, yellow-green, compressed, striated, and leafy at the time of flowering.

DENDROBIUM AUREUM[‡]

Has amber-coloured fragrant flowers produced during February in groups of 4 to 6 from the nodes of two-year old pseudo-bulbs 1 to 1½ feet in length and ¾ inch in diameter, the lip is amber-coloured with brown and purple markings.

DENDROBIUM BARBATULUM[§]

Has flowers 1 inch in width, ivory white with a slight tinge of pink, and produced in dense erect racemes from leafless pseudo-bulbs 1 foot in length.

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[*] *Albo-sanguineum*, white and crimson.

[†] *Aqueum*, watery.

[‡] *Aureum*, golden.

[§] *Barbatulum*, small-bearded.

DENDROBIUM CRETACEUM*

Has during the hot season flowers chalkey-white in colour, solitary from the joint of long leafless stems, small, downy lip, with a pale yellow disc pencilled with crimson, margins ciliated; pseudo-bulbs 8 to 14 inches in length by ½ inch in diameter, a compact pendulous species.

DENDROBIUM DALHOUSIANUM.

An evergreen species, has flower 3 to 5 inches in expansion, in colour buff, shaded with pale lemon, lip of the same colour, spotted with two large blotches of dark crimson and margined with rosy-pink; racemes drooping, 6 to 10 flowered, produced from the growth of the previous year during the hot season. Pseudo-bulbs stout erect, 3 to 5 feet in height, about 1 inch in diameter, having purple lines running their entire length.

DENDROBIUM FARMERI

An upright-growing evergreen species attaining about 1 foot in height. The stems are club-shaped and bear several shining dark green leaves towards the top. The sepals and petals are pale straw-coloured tinged with pink and the disc of the lip golden yellow.

DENDROBIUM FORMOSUM†

Has thick-leaved white flowers 4 to 6 inches in expansion produced from the point of the pseudo-bulb. During the hot season the lip is large, white, with an orange throat. The spikes are 3 to 8-flowered, the pseudo-bulb 1 to 1½ feet in height and 1 inch in diameter, and bearing 8 to 10 leathery leaves.

DENDROBIUM NOBILE‡

A grand evergreen odorous species producing flowers in colour pure white, tipped with rosy pink; lip white, rosy pink in front blotched at the base with deep velvety crimson. Pseudo-bulbs 2 to 3 feet in height and ½ inch in diameter, bearing 10 to 16 bright green leaves.

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* *Cretaceum*, chalkey.

† *Formosum*, beautiful.

‡ *Nobile*, noble.

DENDROBIUM PARISHII.

A fine, semi-erect, deciduous species bearing flowers in colour purplish-rose, fading into white towards the centre, generally twin; lip shorter than the petals and petals very woolly rose-coloured with two eye-like purple blotches in the centre, pseudo-bulbs 8 to 14 inches in length and ½ inch in thickness enveloped in thin epidermis.

DENDROBIUM PIERARDII

Has flowers creamy white or delicate pink with a primrose lip and produced on long festooned pendulous stems 2 to 4 feet in length and ⅓ inch in thickness.

PHALÆNOPSIS*

Epiphytal orchids having a very short stem, no pseudo-bulbs, a few broad, thick, leathery leaves notched at the top and showy racemose flowers.

PHALÆNOPSIS AMABILIS.†

This very lovely orchid is more scarce and as valuable in India as in England, although its cultivation in India presents no special difficulty in the moist districts. A hanging basket formed of spars about 1 inch square and 1 foot long fastened together by running a wire through holes in the ends is well suited for it. The basket may be filled with large pieces of charcoal, potsherds, and moss and the plant kept where the air is moist and protected from direct sunlight and watered freely throughout the year. The varying degrees of natural moisture available in the air at different seasons is sufficient to give it the alternating seasons of growth and rest necessary. The flowering season may be extended almost throughout the year if a number of plants are kept under different treatment as regards heat and moisture, but the greater number of plants of this orchid flower during February to April.

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* *Phalænopis*, from *phalaina*, a mouth, and *opsis*, resemblance; referring to the appearance of the flowers.

† *Amabilis*, lovely.

PHALÆNOPSIS SCHILLERIANA

This differs from other species in having the leaves marbled and mottled with light green on a rich green ground, the flowers of a rosy tint varying in intensity and the roots fattened and rough.

PHALÆNOPSIS ROSEA*

Has oblong leaves slightly broader at the apex and flowers white tinged with pink and having the lip deep violet in the centre and slightly tinged with orange on the side lobes.

PHIUS GRANDIFLORA†

Is a charming terrestrial orchid with folded lance-shaped leaves from a short stem and erect spikes of flowers shading off from white to crimson brown. It thrives planted out on a bank of rich soil kept moist during the growing season and shaded from direct sunshine only and flowers in January-February.

PHIUS ALBA‡

Belongs to a different section of the genus, is often called *Thunia alba*, and differs much in appearance from the above, resembling a *Dendrobium* more in habit and appearance, but distinguished by the stem growing 1½ feet in length furnished with two rows of sword-shaped, sharp-pointed leaves having three nerves and large white bracts which enclose its pure white flowers measuring 2½ inches in width, of which 3 or 4 appear at the end of the branch in August. This plant may be found in Lanowlee woods and other dense forests on the Western Ghauts, which have very heavy rainfall from May till October, and the remainder of the year dry.

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* *Rosea*, rosy.

† *Grandiflora*, large-flowered.

‡ *Alba*, white.

PLATANTHERA* SUSANNÆ.

A grand terrestrial orchid found in hilly districts with heavy rainfall, the stem attains 3 feet in height and bears ovate, oblong, acute leaves, the upper ones sheathing, and large white fragrant terminal flowers having the lateral lobes of the labellum deeply fringed.

RHYNCHOSTYLIS† RETUSA‡

Is the correct name of the beautiful orchid, better known as

SACCOLABIUM§ GUTTATUM‖

An epiphyte abundant on the Western Ghauts, having two-ranked leathery leaves 1 foot in length and 1 inch in breadth, channelled unequally, 3-toothed at the apex, longitudinally striped with light and dark green, and having the sheathing part at the base of a very dark green and remaining adherent to the stem. The flowers are white, striped, or spotted with violet-pink and produced in a dense cylindrical drooping or pendulous racemes.

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* *Platanthera*, broad-flowered.

† *Rhynchostylis*, from *rhynchos*, a beak, and *stulos*, a pillar, alluding to the shape of the column.

‡ *Retusa*, retuse.

§ *Saccolabium*, from *saccus*, a bag, and *labium*, a lip, alluding to the baggy lip.

‖ *Guttatum*, striped.

SACCOLABIUM RUBRUM*

Has flowers of a deep rose colour in dense erect axillary oblong racemes, about 6 inches in length, sepals and petals ovate, lip linear, with a long slender compressed spur; the leaves are dark green, thick, linear, slightly channelled, 3 to 4 inches in length, 2-lobed at the apex. Stem unbranched, 8 to 10 inches in height, a common orchid near Mahableshwar.

VANDA.†

A genus of beautiful epiphytal orchids with showy, fragrant flowers and thriving with more exposure to the sun than orchids generally need; the stems are leafy, not pseudo-bulbous: the leaves are two-ranked, spreading or sometimes terete (a long narrow cylinder like a pencil). Abundant water during the rainy season and a cool moist atmosphere with occasional syringing during the season of rest suits them. If fastened with some moss to an upright post wedged into a pot with pieces of charcoal and potsherds the plants can be moved about easily and look well.

VANDA HOOKERIANA

Has flowers 2½ inches in expansion, sepals white, tinted with rose, and petals large, white, spotted with magenta, undulated, oblong, the lip wedge-shaped, at base 3-lobed, 1½ inches broad, white, lined and spotted with magenta purple, and having a large deep purple auricle on each side of the column. The leaves are 2 to 3 inches in length, terete, pale green, and pointed.

VANDA TERES‡

Resembles the above, but is more straggling in habit.

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* *Rubrum*, red.

† *Vanda*, the original name of an Indian species.

‡ *Teres*, terete.

VANDA ROXBURGHII

Has sepals and petals pale green with checkered lines of olive-brown, oblong, ovate, the outer surface white, the lip violet-purple, convex in the front part, deeper purple towards the apex, the lateral lobes white, lanceolate the spur pinkish, short, racemes 6 to 12 flowered on erect peduncles. Leaves tongue-shaped, recurved, channelled, leathery, and obliquely 3-toothed at the apex.

VANILLA* PLANIFOLIA†

A climbing orchid bearing large white flowers and yielding the valuable flavouring substance vanilla, which is the ripe pods cured. The plant thrives in a moist conservatory if planted on a bed of loose rich soil and permitted to climb up a post, the flowers are 2 inches in width, greenish outside and white within, they appear at the top of the stem and need to be fertilised by hand to obtain the fruit.

SCITAMINEÆ‡

The Ginger and Arrowroot Family.

Is a very important group of herbaceous plants, some of large size (*musa, kela*), others are important condiments (ginger, turmeric), and a few are highly ornamental (alpiana). To grow any large herbaceous plant successfully an extremely rich soil, abundant water, and free drainage are necessary, and in this family the produce either of fruit, as in the banana or of under-ground stems, as in the ginger and turmeric, is in proportion to the amount of leaf development that has been duly exposed to light. Therefore a very rich soil with the necessary water, planting sufficiently thick for the plants to protect each other, yet not thick enough to prevent access of light, are important considerations.

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* *Vanilla,* from the Spanish *vainilla,* a little sheath, in allusion to the shape of the fruit

† *Planifolia* flat leaved

‡ *Scitamineæ* from *scitamentum,* a delicacy, alluding to the numerous delicacies produced by the family

Propagation is effected by division of the root (rhizome).

ZINZIBAR* OFFICINALE, *Ginger, Adruck*, green, *Soont*,
dry ginger, and

CURCUMA LONGA,† *Turmeric, Hullud*,

Should be cultivated on a small scale in every garden. In field culture from February to April plantations are ploughed up and the roots prepared for market. At the same time, in land that has been extra carefully ploughed, manured, and laid out in ridges for irrigation, in the same manner as preparation is made for planting sugarcane, pieces of the fresh end of the rhizome, about an inch long, are planted about one foot apart, between ridges which stand about eighteen inches apart, and freely irrigated. Subsequent culture consists of weeding and keeping the soil open.

MARANTA ARUNDINACEÆ, *Arrowroot, West Indian.*

The cultivation of arrowroot has lately been tried over a wide area in Western India with complete success as far as growth of the plant is concerned. At Rutnagherry it has been cultivated during many years, and recently at Poona, Nariad in Guzerat, and Gondul in Kattywar it has been tried with complete success. It has proved by no means fastidious regarding soil, fine sand at Nariad and loam and clay loam at Poona being equally suitable, provided it is heavily manured and irrigated. At Rutnagherry, where the rainfall is heavy, irrigation has not proved necessary except for the nur-

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[*] *Zinzibar*, from the Arabic *zenzibar*. *Officinale*, sold in shops.

[†] *Curcuma* from the Arabic *kurkum*. *Longa* long rooted

ers beds. In dry districts the ground may be prepared as for sugarcane by thorough working and manuring heavily with town sweepings. The planting may be done by planting green shoots by pressing the base of the shoot into freshly watered soil at a distance of one foot apart between ridges set up for irrigation 18 inches apart. Another system applicable in districts having a heavy rainfall is to cut off the small end of the "root" (truly an underground stem or rhizome) when taken up for preparing arrowroot starch and planting the pieces close together in beds prepared in a cool place where water enough to keep them from shrivelling can be given. As the monsoon approaches those pieces will send out a great number of green shoots which may be planted out in the open fields as soon as the soil is moist with rain. The produce is generally 6 to 7 tons per acre—over 12 tons per acre has been grown at Poona and the proportion of pure starch obtained is about 10 per cent of the weight of the roots.

A showy variety with white variegation is much grown as a pot plant.

The following is a list of prices in London of the varieties of *Maranta* offered by Mr. W. Bull, King's Road, Chelsea; many of those varieties are in cultivation, but descriptions without coloured plates would not be useful:—

MARANTA ALBO-LINEATA, 3s. *6d.*

AMABILIS, 5*s.*
ARGENTEA, 10s. *6d.*
ARGYREIA, 5*s.*
ARUNDINACEA *(The Arrow-root Plant)*, 7*s.* 6*s.*
ASYMMETRICA, 10s. *6d.*
BACHEMIANA, 7s. *6d.*

BARAQUINII, 3*s.* *6d.*
BELLA, 7*s.* *6d.*
BICOLOR, 5*s.*
BINOTII, 15*s.* and 1 guinea.
CHIMBORACENSIS, 5*s.*
CONSPICUA, 7*s.* *6d.*
FASCIATA, 3*s.* *6d.*

GOUTETII, 5s.
GOVEANA, 5s.
GRATIOSA, 10s. 6d.
ILLUSTRIS, 3s. 6d.
KERCHOVEANA, 3s. 6d. & 5d.
LEOPARDINA, 7s. 6d.
LIETZEI, 5s. and 7s. 6d.
LINDENI, 3s. 6d.
LUBBERSII, 3s. 6d.
MAKOYANA, 3s. 6d.
MASSANGEANA, 3s. 6d.
MUSAICA, 10s. 6d.
NITENS, 7s. 6d.
NITIDA, 10s. 6d.
ORNATA, 3s. 6d.
PICTURATA, 7s. 6d.
PORPHYROCAULIS, 5s.
PRASINA, 7s. 6d.
PRINCEPS, 3s. 6d. & 5s.
PULCHELLA, 5s.
RADIATA, 5s.
REGALIS, 3s. 6d.
ROSEO-PICTA, 3s. 6d.
SEEMANNI, 7s. 6d.
SMARAGDINA, 7s. 6d.
SPECIOSA, 10s. 6d.
SPLENDIDA, 3s. 6d.
TUBISPATHA, 3s. 6d.
UNDULATA, 5s. and 7s. 6s.
VEITCHII, 3s. 6d.
VITTATA, 3s. 6d.
WALLISII, 3s. 6d. and 5s.
WARSCEWICZII, 3s. 6d.
WIOTII, 5s.
ZEBRINA, 3s. 6d.

ELETTARIA[*] CARDAMONUM.[†]

The cultivation of the cardamom in other than the hilly districts of Southern India has often been tried with very little success. The conditions under which the plant thrives are an altitude of 2 to 4,000 feet, a heavy rainfall extending from May to January and the remainder of the year dry. To get the seed to germinate it should be gathered from the plants without the usual preparation for the market by soaking in lime water then mixed with damp-leaf mould and kept in a moist place. In my own experiments the seed germinated freely nine months after sowing. Captain Dickson, who was in charge of the Wynaad district, wrote :—"The cultivators cut down a large tree before the rainy season and find that about a month later numerous cardamom plants have sprung up from the soil the tree stood upon. These are planted in suitable places and 4 years later the little flowers stalk shoots from the ground at the base of the leaf stalk during February and the fruit is ripe in November. It continues to bear for three years, and the cultivators believe that seed will never produce cardamom plants.

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[*] *Elettaria, elettari,* its vernacular name in Malabar.

[†] *Cardamonum,* cardamom.

KÆMPFERIA ROTUNDA, *Boii-champa.*

A very fine deciduous plant having in April and May abundant large odorous white and violet flowers appearing on the surface of the ground before the leaves. With the rainy season the oblong radical leaves of a deep green shaded with dark tints appear. Ordinary border treatment suits it, and it makes a useful pot plant for verandahs, as it may be laid aside in a shady place during the dry season.

KÆMPFERIA GILBERTII

Resembles the above, but is distinguished by a clear white margin and streaks.

STRELITZIA* REGINA.

A very showy herbaceous plant having ovate, entire leaves 15 by 6 inches on radical petioles 4 feet in length and large orange and purple flowers borne in clusters in the axil of 2 leafy bracts.

This plant is of easy cultivation with ordinary moist border treatment and may be propagated by division. It is very scarce. A gentleman at Poona has during many years possessed the only plant in the district. It is growing in a broken-down tub, which has stood on the same spot during many years. It evidently is very hardy.

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* *Strelitzia*, in honour of the wife of Charles III., Charlotte of Mecklenburgh Strelitz. *Regina*, the queen.

RAVENALA* MADAGASCARIENSIS.

A tall plant having leaves like the banana arranged in two rows and forming a large fan-like head borne after many years' growth on a stout palm-like stem. The flowers are large and showy, and are succeeded by seeds covered with a most beautiful blue-coloured membranous covering. This plant needs a moist atmosphere and a very rich soil kept moist. It is propagated by seed.

CANNA.

Hybrid varieties of this beautiful genus are now numerous and common in gardens. The best position for them is a small island made in a pond with water that does not stagnate; if the water runs dry at times it will be advantageous. To propagate divide the roots (rhizomes) or take seeds and file the outer cover thin, or, better, bury in a manure pit for six months or so.

ALPINIA NUTANS, *Panag-champa*,
COSTUS SPECIOSUS, *Keoo, Keemoka*,
HEDICHIUM FLAVUM, *Sontaka, Kattu-rityam*,
HEDICHIUM CORONARIUM, *Goruk-natha, and*
HEDICIUM SCAPOSUM, *Colla Soona*,

Are beautiful plants for the banks of a water-course or tank. Propagated like *Canna*.

MUSA SUPERBA, *Chinic*,

Is often called the wild plantain, as it belongs to the same genus. It is a native of the Western Ghauts, where during the rains it may be seen adorning the hill-sides with its magnificent foliage. It may be raised from seeds, but it is better to procure bulbs from its native habitat. The bulbs may be taken up in April and will carry a great distance without loss. A rich soil and abundant watering during the rains are necessary. After the leaves dry up, no water should be given.

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* *Ravenala*, said to be the native name of the plant in Madagascar.

MUSA SUMATRANA

Is a dwarf species with a rich purple variegation on the leaves. Very showy when grown on a bank of rich soil in the conservatory.

THE BANANA.

The small, yellow, thin-skinned fruit, called by the natives " son-kale," is one of the finest fruits in cultivation. It is to be found plentifully throughout the country, but is expensive; as owing to the great height to which it grows it is very easily broken by the wind, and must have a really well-sheltered situation. It thrives equally well in the black soil of the Deccan or the alluvial of the Concan, provided the soil is enriched by a liberal supply of strong manure; and if otherwise properly attended to will thrive on soil containing more salt than is favourable to cultivated plants generally. Oil-cake, which is too strong a manure for most plants, is excellent for the banana. It should be broken small and dug in near the roots. Night-soil is also an excellent manure for the banana; it may be used fresh if decayed is not procurable.

To make a plantation of bananas, dig out shoots from the base of old plants, cut off broken roots and decayed parts, and soak the cut portion in a mixture of cowdung, earth, and water, then plant 8 feet apart and water freely.

There is a large red-fruited variety of fine flavour that is plentfully grown about Bassein. It will grow freely enough in black soil, but does not perfect its fruit properly in such a soil. Probably the red colour of the fruit is produced by some particular salt in the soil, and where this is wanting, it refuses to thrive. It ripens well in soil of a yellow loamy character. The Chinese banana is a very dwarf variety, but its fruit is inferior to the sorts previously mentioned. March is the proper planting season for the Concan and the Deccan, that is, the beginning of the hot season. Where the climate is excessively hot and dry during the hot season, it will be better to defer planting till near the end of the season. Plenty of water once in four days and free drainage are neces-

Varieties of Banana cultivated in Western India.

Rai or Raj-kale, Ram-kela—Stem very strong, reddish, medium height; leaves with red midrib and edges; fruit very large, cylindrical, red-skinned, of superior flavour.

Son-kale Champa—Stem very tall, weak; leaves of thin texture, large; fruit small, cylindrical, yellow, thin-skinned, of very fine flavour, considered the best.

Kalee—Stem medium; leaves short, narrow, with red midrib; fruit large, average 5½ oz., yellow, thick skinned, flavour rich when cooked or dead ripe.

Goosavee—Stem medium height; fruit medium size, yellow, thin-skinned, flavour superior.

Botattee—Stem tall, stout; fruit three-cornered, thick-skinned, yellow, sweet flavoured.

Googee, Musa Cavendishii—Stem 6 feet, green, very stout; fruit cylindrical, yellow, of inferior flavour, except when dead ripe, then it is rich.

Lokandee—Stem, 10 feet, reddish, stout; leaves of thick texture, large; fruit long, cylindrical, large, skin medium thickness, yellow, superior flavour.

MUSA* COCCINEA.

A very ornamental species growing about 4 feet in height with oblong leaves about 3 feet long and 6 inches wide and spikes of flowers enclosed in bright scarlet bracts. It thrives in any rich garden soil kept moist from April till December and is propagated by division of the underground stem (rhizome or rootstock).

MUSA URANOSCOPES

Is described by Bull as follows :—" This new Queensland banana will form a noble ornament for a warm conservatory. It has a thick handsome stem, formed as in its allies, by the sheathing leafstalks, which support large broad leaves not unlike those of *Musa ensete.* The flowers and fruit are borne in erect racemes, unlike those of the ordinary banana in which they are nodding. It is found on the scrub lands of the Johnstone and Daintree Rivers in Queensland."

MUSA ENSETE.†

This very ornamental species is a native of Abyssinia. In our gardens it is of comparatively slow growth and retains its ornamental condition a long time. Its chief characteristic is the bright red of its massive midribs. It is propagated from seed and enjoys a rich soil regularly watered and with good drainage.

MUSA (SAPIENTUM‡) VITTATA§

Is an ornamental variety with white streaks in the leaves. Its cultivation is exactly what is given to *son-kale.*

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* ***Musa,*** said to have been given by Plumier in honour of Musa, a freedman of Augustus. ***Coccinea,*** scarlet.

† ***Ensete,*** the vernacular name

‡ ***Sapientum,*** wise men's.

§ ***Vittata,*** striped.

MUSA TEXTILIS,* *The Manilla Hemp Plant,*

Is a large, strong-growing species of plantain which has been introduced on account of its valuable fibre. Its fruit is worthless, and it is in specially favourable positions, with a heavy rainfall distributed over nine months of the year, only, that its cultivation may be expected to be profitable. It is useful in the garden if much grafting is done, because the fibre in the leaf-stalk is stronger than that of the common banana, but it should not be planted where the banana is grown for fruit, because its pollen will fertilize the ovules of the other species, and the result will be abundant hard black seeds as large as a pea in the fruit that, without fertilized ovules, are such delicious food.

"GRAFTING" THE BANANA.

Firminger tells us that a curious notion is prevalent among the natives that the plantain may be made to bear two or more kinds of fruit upon the same bunch. This result, they affirm, is brought to pass as follows:—A young sucker is dug up from each of two kinds of plantain. The suckers must be as nearly as possible of the same size; these are split up cleanly in halves with a sharp knife, a half of one of the kinds is closely applied and bound to a half of the other kind, and then planted in the ground in the ordinary way. These halves will soon unite and form one plant, which eventually will throw up a stem bearing two kinds of fruit. "Curious notions" on various subjects are commonly held by people who know little about the matter. Firminger might have told us what class of natives he referred to. The story is current among talkative pattiwallas and people of that class—the same sort of people who in England will show how to make a gardener's cut, such as gardeners seldom, if ever, make,—but the cultivating class have a very sound knowledge of cultivation, which excludes such stuff entirely; because, the meristem of monocotyledonous plants occurs on a cross-section in minute points, and not in a continuous ring as in dicotyledonous plants, and to bring the minute points of meristem (or cambium) of two different plants into contact, is so difficult that it is impracticable. The grafting of monocotyledonous plants, such as bananas, grasses, or palms, has not yet been effected.

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* *Textilis*, textile.

TO INDUCE THE BANANA TO BEAR ITS FRUIT IN A PARTICULAR DIRECTION.

The banana cultivators at Bassein, near Bombay, know how to induce the banana to produce its fruit in any particular direction, so that a long line of plants may all have their fruit hanging to the same side and the next line may have its fruit hanging in an opposite direction, so that when a person looks between two rows of plants the whole of the fruit may be seen at once—an arrangement that has many obvious advantages. I believe it is done while planting, by placing the first leaf of each shoot in the direction the plant is desired to bear fruit.

HELICONIA.*

A genus of easy culture in a rich border kept moist and slightly shaded. The species are propagated by division.

HELICONIA AUREA STRIATA.†

A bold-looking plant of noble aspect, resembling a dwarf Musa in general appearance. The leaf-stalks are striated with green and yellow and become recurved at the top. The leaf-blade is elongate-ovate, cordate at the base, and cuspidate at the apex ; deep green, with the course of the parallel-curved veins from the costa to the margin, traced out by yellow lines producing a freely marked and very striking varicgation. Though closely related to the stately bananas, it is a comparatively dwarf plant, still one of an imposing character. It is a native of the South Sea Islands.

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* *Heliconia*, from Helicon, a mountain in Greece consecrated to the muses.

† *Aurea striata*, golden-striped.

HELICONIA BICOLOR*

Has gracefully arching lanceolate leaves 15×4 inches on stalks rising from the ground and bearing white flowers enclosed by scarlet bracts.

HELICONIA BAHAI†

Has ovate-lanceolate leaves 18 by 8 inches and showy bright orange bracts enclosing the flowers. This forms a very showy plant in a shady place, in full exposure the leaves become partly withered.

HELICONIA METALLICA‡

Has broadly lanceolate leaves with the central rib margined and curving veins of a bronzy red, the lower side of the leaf is entirely of the same tint.

HELICONIA VINOSA§

Has broadly lanceolate stalked leaves 18 inches in length of a bright green above and purplish beneath, the upper surface is transversely plicate or ridged and the stalks about as long as the blades of the leaves.

BROMELIACEÆ.

The Pine Apple Family.

This family is a group of South American plants much cultivated in this country and resembling the pine-apple (*ananas*) in the arrangement and texture of their leaves. Many of these plants are epiphytal, and beautiful effects may be produced by fixing the plants on the stems of trees in imitation of the natural condition by tying some leaf-moulds in sacking with moss on the outside. If *Pitcairnea bromelifolia* is planted in this manner and watered with the syringe daily during the rainy season it will display its fine blossom to advantage and will need watering only about once weekly during the dry season.

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* *Bicolor*, of two colours.

† *Bahai*, from Bahai.

‡ *Metallica*, metallic

§ *Vinosa*, wine-coloured

ANANASSA SATIVA, *Ananas, The Pine-Apple.*

A moist climate, friable pale brown loam, thoroughly worked, manured, and drained are the conditions favourable to this fruit.

Strong suckers may be planted between January and March in lines two feet apart with 18 inches between the plants. If the under-drainage is not thorough, ridges should be made one foot high and the suckers planted on the top. Shade with some thin branches, and water carefully so that the young plants may not rot before roots are formed. As soon as the plants are rooted and have begun to grow give a liberal supply of dried salt-fish as manure and keep the soil moist. During the monsoon take the first opportunity of dry weather to give more manure by spreading it on the surface and digging between the plants so as to bury the manure and keep the soil open. During the cold season very little water will be necessary, but as soon as the fruit is formed more water should be given to assist its growth.

Shade will increase the size of the fruit, but will not improve the flavour.

IRIDACEÆ.

The Iris Family.

In our gardens this family is represented by

THE GLADIOLUS,

An herbaceous plant with sword-like vertically flattened leaves and spikes of flowers arranged on one side of the stem (secund) of every shade of colour from pure white to bright crimson and of particular use in house decoration, because, when half opened, the spike can be cut and taken in-doors, where by giving fresh water daily it will continue to open flowers up to the end of the spike.

Any rich, friable, well-drained soil is suitable. In districts having slight rainfall, plant the bulbs at the beginning of the rainy season four inches deep ; when growing fast water freely with liquid manure. After flowering, when the leaves become yellow, gradually reduce the supply of water, and when fully dried, dig up and store in a cool dry place till next planting season.

The Gladiolus thrives well at Poona, Bangalore, and other places having a similar climate, but where the rainfall is heavy it is difficult to manage, unless bulbs are brought every season from some of the dry districts or from Europe. In such cases the bulbs may be planted during November and December: if far north protection at night will be necessary to reduce radiation. In case of a supply of bulbs being received from Europe in December and excited to grow from the damp in the case, it is advisable to plant at once deeply in a sheltered place with rich sandy soil. As soon as the flowers appear the spikes should be cut, and if the foliage is kept healthy one or two new bulbs will form above the old one and be in fine condition for planting the following season.

IRIS FLORENTINA.

This Iris thrives at Poona with ordinary border treatment and produces its large white flowers during the rainy season.

IRIS JAPONICA

Has the standard lilac and the falls spotted with yellow and white, fimbriated at the margin and having a crest two-thirds of the way up.

It thrives on the margin of a pond, where its roots reach water easily.

PARDANTHUS CHINENSIS

Is a common yellow-flowered herbaceous plant, which thrives with ordinary garden treatment.

TIGRIDIA PAVONINA

A showy herbaceous plant having lanceolate or sword-shaped folded acute leaves 10 to 18 inches in length clasping at the base and bearing large orange-coloured lily-like flowers. In districts with slight rainfall ordinary border treatment suits it well.

AMARYLLIDACEÆ.

The Amaryllis or Crinum Family.

Our gardens are rich in beautiful flowering plants, mostly with bulbous "roots" (short underground stems) belonging to this family.

As usual with bulbous-rooted plants seasons of rapid growth alternate with periods of rest more or less complete. During the growing season thorough watering is necessary. during the resting period very little is required, but protection from the sun is desirable.

HIPPEASTRUM* AMARYLLIS.†

Some of the new varieties of Amaryllis are great acquisitions in our gardens, as the flowers are large, of great substance, and in many shades of colour, from pure white to crimson, blended in great varieties of streaks and bands, affording most beautiful contrasts and of especial value, because, with a little management, the plants may be in bloom during the first few weeks of the monsoon when flowers are very scarce.

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* *Hippeastrum*, from *hippeas*, bright, and *astrum*, a star.

† *Amaryllis*, a country woman mentioned by Theocritus and Virgil.

These beautiful lilies grow freely in any ordinary rich garden soil, and naturally flower during the hot season; but after keeping the bulbs dry during December and January they may be taken up during February, and kept on a cool dry shelf till the monsoon breaks, then the bulbs should be planted and will flower about three weeks later. If left in the ground and watered occasionally the bloom comes between the middle of February to the end of the hot season: at this season the flower stem may be cut near the base soon after the first flowers are open and kept in water in-doors. By giving fresh water and cutting a small piece off the bottom of the stem daily the flowers will continue opening and retain their beauty and fragrance a considerable time: some have been kept fresh during 15 days of an Indian April. Propagation is effected by off-sets and by seed. Slight shade prolongs the duration of the flowers.

HIPPEASTRUM RETICULATUM.*

A bulbous plant producing two or three radical oblong-lanceolate dark green leaves having a distinct ivory white midrib and spreading on the surface. It rarely flowers in the Deccan, but at Calcutta its flowers, of a beautiful soft pink and white, about 3 inches in diameter, on stalks about one foot in height, are frequently to be seen in conservatories during the cold season. It is evident that a moist equable temperature suits it.

HÆMANTHUS† VIRESCENS.‡

A small bulbous plant bearing large heads of crimson flowers on short upright stems. A rich well-drained soil and plenty of water when growing, but very little during the hot season, is the treatment it requires.

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* *Reticulatum*, netted.

† *Hæmanthus*, blood flower, referring to the red colour.

‡ *Virescens*, greenish.

EUCHARIS[*] AMAZONICA,[†]

One of the most beautiful of the Amaryllis family; the flowers are pure white and delicately perfumed. It requires a rich soil and a moist atmosphere throughout the year and plenty of water during its growing season, from June to February. In the hot season it should be permitted to dry to some extent, but never kept dust dry.

CRINUM.[‡]

A genus of the Amaryllis family yielding very fine flowers, mostly pure white, but a few have tints of red and purple. They flower during the rains, and many are sweetly perfumed. They enjoy a very moist rich soil, and during the growing season require large supplies of water. Propagate by division of the roots. About the beginning of July the Crinums are subject to the ravages of a black caterpillar which does great mischief by eating away the centre of the leaf and leaving a film of the epidermis to protect itself; cutting out the caterpillars is the only means of checking its ravages.

CRINUM AUGUSTUM.

This is a very showy species, having a pleasant perfume and flowering freely with ordinary moist border treatment. Its flowers are from 12 to 20 in an umbel; the perianth 3 to 6 inches long; white tinged with red inside and deep purplish red outside. The scape is lateral, 2 to 3 feet in length and compressed. The flowers appear at intervals between June and December. This species may be propagated by offsets which are not produced freely; therefore the plant is rare in gardens.

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[*] *Eucharis*, a manufactured name, meaning very graceful.

[†] *Amazonica*, from the Amazon.

[‡] *Crinum*, from *krinon*, the Greek name for lily.

CRINUM ASIATICUM, *Nagdoun*,

And several other species are commonly in cultivation.

CRINUM BRACHYNEMA.*

A showy bulbous plant very beautiful when sprouting from bare rocky soil at Mahableshwar about the end of May. The pure white flowers appear before the leaves in heads of 15 to 20 on a radical naked stalk (scape). The tubular part is greenish and equal in length to the expansion of the lobes and the stamens have filaments much shorter than other species of this genus.

In the plains it is advisable to grow this plant in pots and store away in a cool corner after the leaves have dried up. If left in a border it sends up abundant leaves, but does not flower. During the monsoon season it should be grown with shade from noon till evening and abundant water.

CRINUM LATIFOLIUM.†

A very fine bulbous plant having large Amaryllis-like flowers in colour pure white tinged with red on either side of the centre of each segment. The leaves are variable in length—in the Mahableshwar variety about 2 feet in length,—but enclasping each other at the base so as to make a false stem 1 foot in height and having the flower stalk exceeding the leaves by a few inches, forming a very graceful plant. Unfortunately in many parts of the country it is subject to attacks of the crinum fly, a moth that lays its eggs at night, and from the eggs caterpillars, in colour black with orange markings, are developed, which speedily destroy the flowers if the greatest care is not taken. A fine wire gauze covering at night would keep away the fly. *C. insigne*, *C. speciosum*, and in C. *moluccanum* are considered by Mr. Baker of Kew to be varieties of this species.

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* *Brachynema*, having short threads, referring to the filaments.

† *Latifolia*, broad-leaved.

ZEPHYRANTHES* TUBISPATHA† and ZEPHYRANTHES ROSEA‡

Are beautiful Amaryllids with grass-like leaves and rose or white crocus-like flowers. Very useful for the ground-work of a large bed with choice shrubs planted widely apart.

Those plants burst suddenly into bloom about three times yearly after a fall of rain, and the flowers are produced freely enough to cover the ground entirely.

PANCRETIUM§ LITTORALE.‖

An evergreen bulbous plant bearing pure white flowers from June till August. The leaves are linear-pointed, rising from the ground, and during the rainy season 2½ feet by 1½ inches and gracefully curving outwards. The flowers are of 6 linear segments 4 inches by ¼ inch, recurved and united by a corona. This plant is a very beautiful object during the rainy season in the Deccan, whether in a small circular bed or in long lines near the margin of a path. Even when not in flower its gracefully falling leaves are very pretty.

AGAPANTHUS¶ UMBELLATUS.**

A bulbous plant having linear pointed leaves rising from a bulb, which is completely buried, and large umbels of bright blue flowers on a naked stalk (*scape*) rising from the root.

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* *Zephyranthes*, flower of the west wind

† *Tubispatha*, having a path like a tube.

‡ *Rosea*, rose-coloured.

§ *Pancretium*, from *pan*, all, and *kratys*, potent, in allusion to supposed medicinal properties.

‖ *Littorale*, from the seashore.

¶ *Agapanthus*, love flower.

** *Umbellata*, having the branch of the flower stalk spreading from one point.

This plant grows well at Mahableshwar, altitude 4,000 feet, but when brought to the plains flowers freely for a time and then dies. In temperate districts it thrives with ordinary border treatment and is propagated by division.

HYACINTHUS* ORIENTALIS,† *The Hyacinth.*

Bulbs of this fine flowering plant are imported yearly in considerable numbers, and if not heated during the voyage bear flowers fairly in northern districts if protected from cold at night and direct sunshine by day.

PHALANGIUM TUBEROSUM.‡

This is a charming little white lily closely resembling the Snowdrop of Europe, found very abundantly on Deccan uplands. To secure this plant for the garden mark a spot where it abounds while in flower and get the roots dug up at the end of the hot season and planted with conditions approaching that of its natural habitat, that is, a thin soil and water equal to 25 inches during the rainy season. The tubers are eaten as a sacrament by Hindus.

ASPIDISTRA§ ELATIOR‖ VARIEGATA.

An herbaceous plant having oblong, leathery, radical leaves on long petioles and variegated with alternate white and green stripes. It thrives in slight shade with moist border or pot culture and is propagated by division.

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[*] *Hyacinthus*, the ancient Greek name used by Homer for the Iris.

[†] *Orientalis*, Eastern.

[‡] *Tuberosum*, having many thickened roots.

[§] *Aspidistra*, from aspidiseon, a little round shield, in reference to the form of the flower.

[‖] *Elatior*, taller.

DIOSCOREÆ.*

The Yam Tribe.

An important group of climbing plants yielding esculent roots known as *yam, aloo,* and specially adapted for cultivation in districts having a heavy rainfall. Any ordinary garden soil is suitable and propagation is effected by planting the oldest part of the tuber; in many of the varieties this is also the narrowest part and it may be recognised by the buds.

The foliage is of a very luxuriant character, well adapted for covering unsightly objects during the rainy season, but drying up completely soon after several varieties with coloured foliage are in cultivation.

DIOSCOREA GLOBOSA,† *Choopuree Aloo,*

Has roundish tubers internally white and a six-sided twining stem bearing opposite or alternate 5 to 7-nerved, long-stalked leaves expanding at the base (sagittate). The female flowers are few, fragrant; and in erect spikes, the male flowers are abundant in pendulous tassels.

DIOSCOREA ALATA, *Kam Aloo.*

Tubers oblong, white, stems 4-angled, leaves deeply cordate.

DIOSCOREA PURPUREA,‡ *Lal Aloo.*

Tubers oblong outside purplish, inside tinged with red stems six or more winged perrenial near the base.

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* *Dioscoreæ*, from the genus *dioscorea*, after Dioscorides.

† *Globosa*, globular, referring to the root.

‡ *Purpurea*, purple, the colour of the root.

ASPARAGUS OFFICINALIS, *Asparagus.*

The soil for Asparagus should contain much salt, therefore its profitable culture is rarely attained in this country; but the plant yields produce earlier in this country than in Europe. A deep, sandy, well-drained soil, turned over two feet deep and heavily dressed with decayed stable litter and salt-fish and kept moist by regular watering, is necessary.

Asparagus seed may be sown on a small bed and transplanted when several shoots about six inches high are formed, but as the long fleshy roots are easily injured, it is generally preferable to sow where the plant is to remain.

The seed may be sown in lines fifteen inches apart, and the young plants thinned out gradually to one foot apart in the line.

The sowing season must be regulated so that the young plants may not be subjected to great heat and moisture at the same time. November to January is generally suitable, but if the rainfall is light, August is a favourable season. As Asparagus plantations in this country do not last long it is advisable to prepare a fresh one yearly.

LILIACEÆ.

The Lily Family.

This family includes garden plants much valued for ornamental foliage (Dracæna), for bloom (Yucca), and as esculents (Onion). For all the purposes mentioned luxuriant growth is desirable, therefore a soil rich in vegetable matter should be employed with much shelter; and slight shade for the species valued for ornamental foliage.

Propagation is easily effected by cuttings of the stem and by seeds.

GLORIOSA[*] SUPERBA[†]

Grows wild in Concan hedges, and in the Deccan is of easy culture, only requiring to be planted at the root of a shrub with thin foliage and watered freely during the rainy season; but a grub climbs up the plant by night just before flowering time, eats off the top of the shoot, and disappears before day, taking with it all hope of the brilliant blossom. This lily is specially adapted for cutting for house decoration because the flowers retain freshness and beauty for many days. The flower is pale yellow when newly opened and gradually changes to a deep orange red.

POLIANTHES[‡] TUBEROSA,[§] *Gul-chaboo.*

The single and double varieties are common and need no special culture.

DRACÆNA.[‖]

Our gardens have lately been enriched by very many cross-bred varieties of dracæna which are highly ornamental and easily managed.

A rich loamy soil mixed with equal parts of well decayed garden sweepings and sharp sand or broken bricks suits them. The drainage must be carefully looked to, because a slight over-watering or excess of drought disfigures the leaves. As usual in such cases the finest plants may be seen planted out in large raised beds of rich soil, where excess of moisture or drought is more easily avoided than with pot culture. The conservatory is the best place for Dracæna cultivation, but fair plants may be grown in a verandah. To propagate take a plant that has lost some of the lower leaves, a few inches below the lowest leaf make a deep incision, and split the stem about 2 inches from the incision upwards, insert a small piece of wood and bind some leaf mould in moss or sacking round the wound. Keep the soil moist, and after two months sufficient root will be developed to allow the head to be cut off and potted. Then make the remainder of the stem into two-inch cuttings and keep in a frame.

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[*] *Gloriosa*, full of glory, from the beautiful flowers.

[†] *Superba*, superb.

[‡] *Polianthes*, probably from *polios*, white, and *anthos*, a flower.

[§] *Tuberosa*, tuberous.

[‖] *Dracæna*, from *drakiana*, a female dragon.

YUCCA[*] GLORIOSA.

This is a magnificent aloe-like plant with lance-shaped, sharp-pointed leaves and bearing, between April and August, a grand upright panicle of creamy white flowers as large as a hen's egg, which hang gracefully from the branches of the inflorescence. The inside of the flowers is of a purer white than the outside, and if the flower leaves are gently turned outwards they remain in that position, appearing as nearly as possible like a fine Eucharis lily when arranged on a table.

If this plant is set out in a poor soil or in a pot it may remain alive and healthy-looking for many years without flowering. To cause it to flower regularly every year in the dry parts of India it needs nothing more than an ordinary rich garden soil, well drained, and abundant water during the rainy season. In moist districts it should be planted on a high mound of good soil mixed freely with stones and old manure. In short, on a rockery, but with more manure and water than exposed rockery plants usually receive.

To propagate yucca the small shoots that spring from the base of a plant growing in poor soil may be cut off near or below the surface and planted as cuttings giving slight shade, or from a large well developed plant a few leaves may be cut off and a V-shaped incision made round the stem. Some good soil mixed with leaf mould may then be tied round the cut portion and the head supported by a strong stake and watered regularly. In two months the stem will have thrown out roots and may be cut off and planted without danger.

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[*] Yucca, the St. Domingo name.

YUCCA QUADRICOLOR*

Resembles the above, but it is of smaller growth and has striped leaves, in which four shades may be seen. Its cultivation and propagation is similar to the above, but it grows very slowly and rarely flowers in this climate.

YUCCA FILAMENTOSA†

Is distinguished from *Yucca gloriosa* chiefly by the fibrous threads which adorn the leaves and give the plant its popular name of Adam's Needle and Thread. Its treatment is exactly similar to that of *Yucca gloriosa*, which is detailed above.

ALLIUM‡ CEPA,§ *Onion*, *Peeaj*.

Few vegetables are cultivated with more success in the dry parts of India than this wholesome esculent.

The variety most generally grown resembles the common pale-red onion of Europe; it averages 7 to the lb. and is 2½ inches in diameter. It is mostly depressed globular in shape, but evidently little care has been given to secure uniformity. In colour it is pale red outside and creamy-white with occasionally purple streaks inside. The outer skin is membranous and fragile and the flesh very firm. Its pungency is mild, and the bulb keeps very well. White onions are abundant in the market at Bombay, and there has been much enquiry as to their source—no doubt they are brought from Dhulia in

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* *Quadricolor*, four-coloured.

† *Filamentosa*, having many threads.

‡ *Allium*, from *ali*, hot or burning, in allusion to the properties.

§ *Cepa*, the onion.

Khandesh, as the common onion in the market at that station is white in colour, otherwise it differs very little from the pale red sort.

For green onions the seed may be sown twice a month throughout the year. In the rainy season provide thorough drainage. During the hot season provide slight shade and protection from hot winds In dry weather water slightly once a day. For ripe onions sow on a well prepared seed bed in September or October, and when the plants are up a few inches, plant out four inches apart. The ground must be laid out for irrigation, and water given once a week in dry weather. For seed plant well-shaped ripe onions about the beginning of November. Poudrette is an excellent manure for onions, in its absence ashes and decayed sweepings are suitable, it is important that the manure should be well mixed with the soil, and that fresh seed only be sown as the seed looses the germinating power very soon.

ALLIUM PORRUM,* *Leek.*

In districts having a rainfall under 30 inches or more, and i combined with an altitude of over 2,000 feet, fair success i growing this valuable flavouring esculent may be attained b sowing from September to November on a bed of rich friabl soil arranged for thorough watering and sowing fresh seed When the young plants have attained 5 to 6 inches they shoul be transplanted to lines in shallow trenches one foot apart and inches apart in the line Abundant water must be given ar the trenches filled gradually as the plants grow up, then fro between the lines earth should be drawn to the plants, ensure a good length of blanched stalk; shade from afterno sun is desirable.

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* *Porrum,* the leek.

The following description of species and varieties of DRACÆNA are from Nicholson's Dictionary of Gardening. The letters B. M. refer to the Botanical Magazine. The dates refer to the introduction to Great Britain : the introduction to India of most of the plants is nearly coincident.

Dracæna arborea (tree-like).—*fl.* greenish, ⅝in. long. May. *l.* dense, sessile, lorate, 1½ft. to 3ft long, 2in to 3in. wide in middle. *h.* 40ft. Northern Guinea.

Dracæna cernua (drooping).—A synonym of *D. reflexa.*

Dracæna (neat).—*l.* narrow, of a sombre green, with purplish red margins ; the contracted stalk-like base is also green with a slight purplish tinge. *h.* 6ft. Mauritius, 1870. A very useful neat-growing species, with a dwarf, compact habit.

Dracæna cylindrica (cylindrical).—*fl.* white, small ; spike cylindrical, sessile, terminating the stem. *l.* linear-lanceolate or obovate-lanceolate, bright green, spreading. Stem erect, undivided. *h.*—5ft. West tropical Africa.

Dracæna Draco (Dragon).—Dragon-tree. *fl.* greenish-white, very small, forming a large panicle. *l.* lanceolate-linear, entire, glaucous, disposed in a crowded head. Stem arboreous, simple, or divided at the top, and, when old, becoming much branched, each branch being terminated by a head of leaves. *h.* 40ft. Canary Islands, 1640. This very fine species is much more graceful and elegant when in a young state than when it becomes old. The famous Dragon tree of Orotava measured 60ft. in height and the stem was 15ft. in diameter.

Dracæna (elliptica).—*fl.* greenish-yellow, rarely solitary, mostly in pedicellate fascicles of threes. March. *l.* generally spreading, petiolate, coriaceo-membranaceous, elliptical-lanceolate, glossy, acute and mucronate, closely marked with parallel longitudinal lines or striæ, full green; petiole grooved, dilated, and amplexical at the base. Stem fruticose, 2ft. to 3ft. or more high, terete. *h.* 2½ft. India, Java, &c. SYN.

Sanseviera javanica.—There is a pretty variety, *maculata* (B. M. 4787), having its leaves spotted or blotched with yellow.

Dracæna fragrans (fragrant) —*fl.* very fragrant. April. *l.* lanceolate, lax. *h.* 6ft. Tropical Africa. 1768. (B. M. 1081.)

Dracæna fragrans Lindeni (Linden's).—*l.* deep green, traversed their entire lengths by bands of creamy-white and various shades of yellow; elegantly recurved, lanceolate-acuminate. 1879. This plant forms a highly useful subject for decorative purposes.

Dracæna Goldieana (Goldie's).—*fl.* in a dense globose, sessile head, 2 in. in diameter, surrounded on the outside by a few reduced leaves, perianth white, above 1 in. long, with lanceolate spreading segments.—*l.* cordate-ovate, acuminate, with a yellowish-green costa, marbled and irregularly banded with dark green and silvery-grey in alternate straight or furcate bands. West tropical Africa. 1882. A very magnificent ornamental foliage plant of erect habit and with closely-set, stalked, spreading leaves. (B. M. 6630.)

Dracæna marginata (bordered).—*l.* ensiform, densely rosulate, 1ft. to 1¼ft. long by ⅜in. broad, spreading, rigid, green, margined and veined with red. Trunk 4ft. to 5ft. high, 1in. thick, branched. Madagascar.

Dracæna phrynioides (Phrynium-like)—*l.* broadly ovate, acuminate, coriaceous, 6in. to 8in. long, exclusive of the petiole; upper surface very dark green, profusely spotted with pale yellow; under surface paler. Fernando Po, 1863. A very pretty dwarf-growing plant, requiring plenty of heat and moisture to cultivate it to perfection. (B. M. 5352.)

Dracæna reflexa (reflexed).—*fl.* greenish-yellow, nearly 1in. long, very numerously disposed in a handsome branching raceme. *l.* oblanceolate. *h.* 12ft. to 15ft. Mauritius. SYN. *D. cernua.*

Dracæna Saposchnikowi (Saposchnikow's).—*fl.* whitish. Spring. *h.* 10ft. 1870. A tree-like species of branching habit and distinct character. Native country unknown. 1870.

Dracæna Smithii (Smith's).—*fl.* in crowded fascicles in the axils of the panicle and terminating short branchlets, sub-sessile; perianth pale yellow, ⅜in. long. Winter or early spring. *l.* 3ft. to 4ft. long, forming a spreading rosette on the crown of the stem, slightly recurved, not waved, narrowly ensiform, broadest beyond the middle, acuminate, bright green, striated; midrib indistinct above, very strong and prominent beneath. Stem slender, 15ft. high, hitherto quite unbranched, cylindric, almost smooth. Tropical Africa, 1850. This species is closely allied to *D. fragrans.* (B. M. 6169.)

Dracæna surculosa maculata (spotted sucker).—*fl.* pale yellowish, small, disposed in a lax globose corymb. *l.* green, with yellow spots, lanceolate. Old Calabar, 1867. A pretty slender shrub. (B. M. 5662.)

Dracæna umbraculifera (umbrella-bearing).—*l.* 2ft. to 3ft. long, about 1in. wide, dark green, very closely set, horizontal, with the ends slightly recurved, giving it the appearance of a table-top or umbrella. *h.* 10ft. Mauritius, 1778. A very peculiar and distinct species.

Many other plants, usually known as *Dracænas*, will be found described under the genus *Cordyline.*

*Cordyline** *albicans* (whitish).—*l.* long, narrow, pointed, about 2in. broad, narrowed into a long channelled petiole; bright green, with a pale green or whitish border, breaking out, in well-grown matured plants, into a conspicuous white variegation. 1869. Stove.

Cordyline albo-rosea (white and red).—*l.* deep green, edged with rose; whitish when in a young state. 1874. Stove.

Cordyline amabilis (lovely).—*l.* 24in. to 30in. long by 4in. to 5in. wide; ground-colour bright glossy green, which, as the plant grows, becomes marked and suffused with pink and creamy-white; young leaves in large specimens quite rosy. 1871. Stove.

Cordyline amboynensis (Amboynan).—*l.* oblong-lanceolate, acuminate, deep bronzy-tinted green, the lower half having a distinct edging, ¼in. wide, of bright rosy-carmine; petioles tinted with rosy-purple; spreading and gracefully arched. Amboyna, 1876. Stove.

Cordyline augusta (narrow).—*l.* narrow, arching, about 1in. wide, narrowed and compressed at the base into a purplish stalk; dull dark green above, tinted with purple beneath, and becoming slightly bronzed in age. 1869. A slender-growing stove species.

Cordyline australis (Southern).—*fl.* white, densely crowded, sweet-scented, ¾ in. across. *l.* oblong-lanceolate, 2ft. to 3ft. long and 2in. to 4in. broad, striated with numerous paralleled veins. New Zealand, 1823. A very fine species for subtropical gardening, with a stout-branched stem, from 10ft. to 40ft. high.

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* *Cordyline*, from *cordyle*, a club, in allusion to the fleshy roots of some of the species.

Cordyline australis lineata (lined).—A very handsome and ornamental plant, with fine, broad, gracefully recurving foliage.

Cordyline Balmoriana (Balmore's).—*l.* bronzy, with white and rosy stripes. 1875. Stove.

Cordyline Banksii (Banks's).—*fl.* white, loose, very much larger than the bracts. *l.* very long, linear-lanceolate, 5ft. to 6ft. long by 1½ to 2ft. broad, closely striate, and also having six to eight very evident veins on each side of the prominent midrib. Stem sub-arboreous, 5ft. to 10ft. high, simple or sparingly branched. New Zealand, 1860. Greenhouse.

Cordyline Baptistii erythrorachis (red-ribbed) is a form with red midrib.

Cordyline Baptistii (Baptist's).—*l.* 18in. to 24in. long; ground colour green, margined and striped with yellow and pink. 1873. A very distinct form, having the stem as well as the leaves variegated. Stove.

Cordyline bellula (pretty).—*l.* purplish, margined with red, small. 1874.

Cordyline cannæfolia (canna-leaved).—*l.* on long petioles somewhat oblong, with an obtuse apex, which, however, is frequently split; 1ft. to 2ft. long, and 3in. to 5in. wide, slightly recurved, dark green. Queensland, &c., 1820. An elegant stove species, growing to a considerable height.

Cordyline Chelsoni (Chelsea).—*l.* large; ground-colour a glossy dark green, almost black, which, as the plant attains age, becomes mottled and suffused with deep crimson, a broad line of the same colour bordering the leaves on eithe side. 1870. A remarkable stove sort, with a bold fre growth.

Cordyline compacta (compact).—*l.* numerous, crowded, recurved, about 7in. long, and near 3in. broad, oblong-ovate, of a dull green, with a slightly bronzy tint and breaking out into broad streaks of rose-colour when fully developed; petioles 2in. long, margined and tinted with rose. 1873. Stove.

Cordyline Cooperii (Cooper's).—An elegant variety of *C. terminalis*, with deep vinous-red gracefully-recurved leaves. One of the best for decorative work. Stove.

Cordyline Dennisoni (Dennison's).—*l.* 12in. to 15in. long and 4in. to 5in. broad, bronzy-purple. 1871. Habit dwraf and compact. Stove.

Cordyline Duffii (Duff's).—*l.* oblong, 6in. to 8in. wide, glossy, margined and casually barred with rich crimson; the parallel margins of the channelled petiole leaf-base converging and elegantly shaded with light-flamed crimson. 1874. A very beautiful and robust-habited variety of erect and stately growth. Stove.

Cordyline excelsa (lofty).—*l.* broadly-oblong, acute, narrowed at the base into a stalk; arching, of a deep bronzy hue, margined towards the base, and also on the wing of the petiole, with a broad edge, ¼in. wide, of a very deep crimson-lake; this bright colour is sometimes continued throughout the margin of the leaf, and at others breaks into rays and blotches. 1869. Stove.

Cordyline Fraseri (Fraser's).—*l.* somewhat erect, oblong, 1ft. or more in length by 5in. broad, abruptly acute at the apex, suddenly narrowed into the petiole, which is about 3in. long; blackish-purple, with a glaucous bloom, the lower portion having a marginal stripe of deep rosy-lake, which extends down the edge of the petiole. 1873. Stove.

Cordyline gloriosa (glorious).—*l.* broad-oblong, 2½ft. long by 5in. broad, with channelled marginate petioles 6in. long, the edges of which are tinted with the same colour, and it is continued along the marginal portion of the lower half of each leaf; the older leaves of this plant colour gradually, the young ones being green, and showing paler green stripes on those parts which, at a later period, have the peculiar bronzy-orange hue. 1872. Stove. SYN. *C. Shepherdi.*

Cordyline grandis (grand).—*l.* deep and bright green, bordered with white and edged with rose. Somoa, 1874. Stove.

Cordyline Guilfoylei (Guilfoyle's).—*l.* from 1½ft. to 2ft. long, 1½in. to 2in. wide in the middle, and tapering off both ways, striped with red, light rosy-pink, very pale yellowish-white, and a whitish variegation invariably following the lower margins of leaf and leaf-stalk to its juncture with the stem. Australia, 1868. This is a very pretty variety with elegantly recurved foliage. Stove.

Cordyline imperialis (imperial).—*l.* of an erect, arching habit, oblong, acuminate, 1½ft. to 2ft. long by 3in. or 4in. wide, deep green, rayed all over with bright crimson, or pale pink in the young leaves. 1872. The foliage is very leathery, and has a peculiar metallic hue, which contrasts well with the crimson variegation.

Cordyline indivisa (undivided).—*l.* 2ft. to 4ft. long, 1in. to 2in. broad, tapering to a point, pendent, and dark green, New Zealand. A very graceful plant for decorative purpose. Greenhouse.

Cordyline indivisa atropurpurea (dark purple).—A handsome form, having the base of the leaf and midrib on the under side dark purple.

Cordyline indivisa lineata (lined).—*l.* much broader than those of the type, about 4in. broad; sheathing base stained with reddish-pink.

Cordyline indivisa Veitchii (Veitch's).—Similar to the type, but has the sheathing base and back of midrib of a beautiful deep red.

Cordyline indivisa vera (true).—*l.* excessively thick and leathery, 2ft. to 5ft. long and from 2in. to 4in. wide, lanceolate, dark shining green; midrib and veins of a rich deep orange. Stem simple, 2ft. to 5ft. high. New Zealand. SYN. *C. indivisa, Dracæna aureo-lineata.*

Cordyline indivisa (undivided).—A synonym of *C. i. vera.*

Cordyline inscripta (inscribed).—*l.* small, linear-oblong 5in. long by 1in. broad, tapering to a point, and at the base narrowed into the margin of the petiole; colour lively green, streaked with thin lines of dull purple, which here and there break into linear markings of rose-colour; petioles erect, 2½in. long, flushed with purple. 1873. The leaves have a twisted appearance, from the irregular undulations of the margins. Stove.

Cordyline lutescens-striata (yellowish-striped).—*l.* long, gracefully arching, fresh grass-green above yellowish-green on the under side. 1873. Stove.

Cordyline Macarthuri (MacArthur's).—*l.* long, carmin and olive-green. 1877. Stove.

Cordyline magnifica (magnificent).—*l.* 1½ft. to 2ft. lon sometimes 10in. in width, of a beautiful bronzy-pink colo changing when old into a somewhat darker shade; petio nearly purple. 1869. Stove.

Cordyline metallica (metallic).—*l.* oblong-acumin somewhat erect and arching, 16in. long, of a uniform coppery-purplish hue when young, becoming a dark purplish bronze when mature; petioles sheathing, 4in. long, of the same colour as the leaves. 1869. Stove.

Cordyline mirabilis (wonderful).—*l.* oblong-lanceolate very gracefully recurved, of a bronzy-green colour, margined with bright crimson-rose. 1880. Stove.

Cordyline Mooreana (Moore's).—*l.* 4in. wide, 2ft. to 3ft. long, beautifully undulated, deep bronzy-purple; the base of the leaf-stalk and the midrib of a bright reddish-crimson colour. 1868. Stove.

Cordyline nigro-rubra (black and red).—*l.* linear-lanceolate, dark brown, with bright rosy-crimson centres, the young foliage usually entirely of the latter showy colour. A fine variety of bold erect growth. Stove.

Cordyline ornata (adorned).—*l.* small, recurved, oblong, 8in. long, 2in. broad, dark bronzy-green, marked with a narrow margin of rosy-pink, which is continued along the edge of the petioles; petioles almost erect. 1873. Stove.

Cordyline prophyrophylla (purple-leaved).—*l.* broadly ovate-oblong, of a fine deep bronzy hue, contrasting well with the glaucous tint of their under surfaces. Habit somewhat erect-growing. 1870. Stove.

Cordyline pulchella (beautiful).—*l.* nearly 1 in. wide, deeply bronze-tinted, of a spreading-arching habit, the contracted petiole-like base being of a deep wine-red, which colour also marks the edges of the leaves. 1870. Stove.

Cordyline pumilio (dwarf).—*fl.* white; panicle very lax, spreading, 2ft. long, with slender branches. *l.* very narrow, linear, 1½ft. to 2½ft. long, ¼in. to ⅓in. broad, with a stout prominent midrib, and a few slender veins on each side of it. Trunk short, slender, as thick as the finger, or none. New Zealand, northern islands. Greenhouse.

Cordyline Reali (Real's).—*l.* dark green, striped and edged with rose. 1874. Stove.

Cordyline rex (King).—*l.* erect, broadly or oblong-lanceolate, about 1ft. long, of a bronzy-green colour flushed with rosy-purple, freely streaked with bright carmine-rose; petioles margined with purplish-rose, and the back of the costa is of the same colour. 1875. Stove.

Cordyline Robinsoniana (Robinson's).—*l.* long, lanceolate, acuminate, elegantly arched ground-colour light green, variously striped and marked with dark bronzy-green and brownish-crimson, petioles also striped with brownish-crimson. 1877. Stove.

Cordyline rosacea (rose-coloured).—*l.* gracefully recurving-oblong-acuminate, dark bronzy-green, broadly margined with bright pink; some of the young ones almost entirely of a light creamy-pink colour. 1872. A compact-habited dense-growing variety. Stove.

Cordyline rubella (reddish).—*l.* young ones variegated with bluish-rose. 1872. Stove.

Cordyline Shepherdi (Shepherd's).—A synonym of *C. gloriosa.*

Cordyline spectabilis (showy).—*l.* broad oblong-acute, arching, narrowing and compressed at the base into a longish green stalk; of a deep full green, slightly bronzed from being tinged beneath with reddish-purple. 1869. An erect free-growing plant.

Cordyline splendens (splendid).—*l.* dense, short, ovate acute, about 9in. long, 4in. broad, arranged spirally; of a dee bronzy-green, breaking out in the young growth into brigh rosy-carmine; the petioles and bases of the leaves are ma gined with the same colour. 1871. Stove. The colourir sometimes appears in stripes, and at others occupies the whole surface, while the recurved character of the foliage gives the plant a flat, almost table-like head.

Cordyline stricta (upright).—*fl.* light blue, rather crowded. *l.* linear-lanceolate or narrowly ensiform, contracted for some way above the bases, 1¾ft. to 2½ft. long, 1in. to 1¼ broad, with slightly roughened margins; indistinct midrib striated with numerous parallel nerves. Trunk slender, simple, 6ft. to 10ft. high. Moreton Bay. SYN. *Dracæna stricta.* Greenhouse. (B. M. 2575.)

Cordyline stricta congesta (crowded) differs from the type in having broader and more crowded foliage.

Cordyline sulcata (grooved).—*l.* spreading, oblong, abruptly pointed; upper surface scored with numerous shallow parallel furrows, following the obliquely transverse direction of the veins; under surface slightly streaked with blackish purple: petioles purplish. 1872. Stove.

Cordyline terminalis (terminal).—*fl.* sub-sessile, in branched panicles. *l.* petioled, lanceolate, narrowed to both ends, dark green or bronzy and crimson. *h.* 10ft. to 12ft. when fully mature. South Sea Islands, and cultivated everywhere in tropical countries. From this species have originated the host of popular stove so-called *Dracænas.*

Cordyline triumphans (triumphant).—*l.* narrow-lanceolate, appearing to taper into the stalk by the incurving of the winged edges of the petiole, while in the upper part the blade assumes a half-channelled form: black-purple, relieved by the glaucous hue of the under surface and of the petioles, while the edges of the young leaves towards the centre are deeply margined with rose colour. 1875. Stove.

Cordyline Weismanni (Weismann's).—*l.* rather narrow, gracefully recurved; in a young state, light coppery-red, more or less tinged with creamy-white, changing with age to a deep bronzy hue, except at the edges, where they are margined with red. 1871. Stove.

Cordyline Youngi (Young's).—*l.* broad, of a somewhat spreading habit, without being pendulous; in a young state, bright light green, streaked with deep red, and tinged with a rosy hue, changing with age to a bright bronze. 1872. A robust and rapid grower. Stove.

COMMELINACEÆ*

Is a family of herbaceous plants including a few garden ornaments and some weeds which produce flowers *under ground.* This fact is recorded by Dr. Wight, a famous botanist who worked in the Madras Presidency, but appears to have excited little attention, as Cooke in his interesting book, "The Freaks of Plant-life," has not mentioned this remarkable freak. The plants which show this condition are *Commelina communis* and *Commelina bengalensis,* called in Marathi *Kana.* If those plants are dug up carefully, numerous flowers bearing perfect seeds will be found on underground branches, at the same time the plant produces bright blue flowers in the open air, which rarely yield seed. What enemy is the plant seeking to delude by this strange device? Violets have a somewhat similar habit, the beautiful sweet-smelling flowers rarely produce good seed, but small flowers near the root produce seed abundantly.

TRADESCANTIA† DISCOLOR‡

Has upright pointed leaves which are green on the inner and purple on the outer side. When grown in a rich soil regularly watered it is a striking plant easily propagated by cuttings.

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* *Commelinaceæ*, from the genus *Commelina*, after Kaspar and Johann Commelin, Dutch botanists.

† *Tradescantia*, in honour of John Tradescant, gardener to Charles I., who died in 1638.

‡ *Discolor*, of two colours.

TRADESCANTIA ZEBRINA

Is of a creeping habit and its striped leaves are very ornamental when grown in the moist shade of the fern house; there is a beautiful silvery variety in cultivation.

PALMÆ.

The Palm Family.

The cocoanut, betelnut, and date trees serve as types of this group of very graceful trees. In field cultivation a rich loamy soil with water within ten feet of the surface is generally suitable, and for pot culture a compost of loamy soil, old cowdung, decayed leaves, and potsherds in equal parts should be mixed in a pit and kept in a moist state for at least six months before using. Let the pots have the drainage extra carefully arranged, so as to be effectual and yet not take up much space. Water very freely while the plants are making growth, and when at rest give only as much as will keep the soil moist. The following species are desirable garden plants. Propagation is generally by seed, but a few may be increased by divisions of the underground stem.

The following palms thrive well in this country when treated as above with the special conditions noted under each. A peculiarity in the germination of palms is sometimes of importance. The seed produces a shoot which passes downwards to a more or less distance, in some instances attaining 4 feet in depth. At the lower end of this shoot a bud is developed, from which the stem is produced.

ARENGA* SACCHARIFERA.

Firminger very faithfully described this palm as "a beautiful and magnificent palm, throwing up erect from the sides of the trunk its enormous shining black green [pinnate] leaves, which take a graceful plume-like curve towards the summit. This has a fine ornamental effect when grown by the entrance gate of a garden." Fine specimens may be seen at Allahabad, Bombay, and Calcutta; therefore a considerable range of climate is suitable.

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* *Arenga*, derivation doubtful. *Saccharifera*, sugar-bearing.

In its native country, Mollucos, sago is made from its stem and sugar from its juice.

ARECA[*] CATECHU,[†] *The Betel-nut Palm, Supari, Goovaka gooa, Poka chelloo.*

This well known tree need not be described. It thrives best and produces much fruit in districts having a moist atmosphere, but it is only with the aid of heavy manuring during the cold season and regular irrigation during dry weather that good crops are obtained. In dry districts it is grown for ornament.

ARCHONTOPHŒNIX[‡] CUNNINGHAMIANA.

This, we are assured, is the correct title of the beautiful palm well known as *Seaforthia elegans*, a tall slender smooth-stemed pinnate-leaved palm with the pinnæ narrow lanceolate 1 to 1½ feet long, dark green and unequally bifid at the apex.

BORASSUS[§] FLABELLIFORMIS,[||] *Brab, Palmyra, Palm, Tad, Tadi, Tarh, Tal Tala; Carimpana, the female; ampara, the male.*

This grand palm is not much used in gardens, and perhaps rightly so. It takes up much space and generally looks unhappy compared with the same species on hill-sides near

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[*] *Areca*, from its Malabar name.

[†] *Catechu*, one of the sources of the astringent extract catechu.

[‡] *Archontophœnix*, princely date tree.

[§] *Borassus*, a name applied by Linnæus to the spathe of the date. *Flabelliformis*, fan-shaped.

Bombay, where its tall cylindrical stem crowned with immense fan-shaped leaves is a grand feature in the landscape, but in the Botanical Garden at Calcutta a special use has been found for which it is well adapted. On the outskirts of the Garden a gently winding path, about 12 feet in width—has this palm planted near the sides about 10 feet apart; the effect of the thick stems ornamented by the persistent leaf-stalks is strangely happy. To grow this palm quickly a moist climate is necessary, and the seed should be sown where it is required to grow because it first sends a shoot downwards to a depth of 3 to 4 feet, and then from the bottom of this shoot the bud which forms the stem is developed. What a beautiful arrangement for producing a stem adapted to bear strong wind pressure!

CALAMUS ROTANG

Is while young a very graceful plant with pinnate leaves 1 to 1½ feet in length having compressed black spines ½ inch in length on the stem and leaf sheaths, and recurved thorns on the midrib; but when it attains 5 to 6 feet in height and develops from the top of the sheathing petiole its dreadful whip-like tentacles armed with numerous sharp recurved thorns it is time to cut it down.

CARYOTA[*] URENS,[†] *Beerly Mhad, Jeerogoo, Scunda pana.*

This fine hardy palm is figured and described at page 113. It is a native of wet districts, mountains, and in gardens thrive with ordinary border treatment.

CARYOTA SOBOLIFERA[‡]

Resembles the *Beerly Mhad*, *Caryota urens*, in its triangular leaflets abruptly terminated and resembling the dorsal fin of some fishes, but is distinguished by the numerous stems this plant produces, while in the *Beerly Mhad* the stem is solitary.

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[*] *Caryota*, the Greek name of a kind of date.

[†] *Urens*, burning, from its acrid fruit.

[‡] *Sobolifera*, sucker-bearing.

COCOS[*] NUCIFERA,[†] *The Cocoanut Tree, Narel,*

Is a very beautiful tree for a large garden. It grows very freely on the coast, but inland can be cultivated on a river bank with good alluvial soil or on a well-drained terrace with made up soil and abundant water. A cocoanut that has been ripened on the tree should be planted with the husk on a bed of old leaf mould in a shady place. In planting lay the large fruit on its side: from three to six months is required to germinate. When it has formed three or four leaves it can be transplanted safely. Fruit is produced at ages varying from four to twelve years. If a tree is blown down its head may be cut off and inserted as a cutting.

COCOS PLUMOSA,[‡]

One of the most graceful palms in cultivation and apparently a recent introduction, because plants more than 10 years old are not to be seen, still some of the specimens had attained 20 feet to the ends of the leaves in that time, and possibly older plants may differ so much from young ones that they have not been recognised as the same species, as occurs in many palms. This plant has a straight stem and very long pinnate leaves standing upright and recurved at the end forming a graceful plume : the pinnæ are 18 inches in length and ¾ inch in breadth.

Very fine plants may be seen at Poona both fully exposed and in conservatories, and when young in a pot there are few more graceful objects.

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[*] *Cocos*, very doubtful, from *coco*, Portuguese for monkey, from the three circular depressions on one end. See Annals of Botany, Part II., page 184.

[†] *Nucifera*, nut-bearing.

[‡] *Plumosa*, feathery.

DYPSIS[*] MADAGASCARIENSIS,

A dwarf palm with pinnatisect leaves having few pinnæ cleft at the apex. It grows slowly in the conservatory.

ELAEIS[†] GUINENSIS,

The source of palm oil, in a young state is to be met with in several gardens ; it has a fine crown of pinnate dark green leaves and is very ornamental.

EUTERPE[‡] OLERACEA,[§] *Areca oleracea,*

Called the cabbage palm because the terminal bud may be cut and eaten as cabbage. It has the leaves pinnately divided, "the segments being lanceolate linear, acuminate glabrescent, and the leaf-sheath long, cylindrical, pale-green, finally falling away completely along with the rest of the leaf, so that the stems appear clean and naked up to the base of the lowest remaining leaf."

GEONOMA[‖] GRACILIS.[¶]

A graceful palm with a slender stem bearing pinnate arching leaves with long linear dark-green pinnæ. It thrives in the conservatory of the Calcutta Botanical Garden.

HYDRIASTELE[**] WENDLANDIANA, *Kentia*[††] *Wendlandiana.*

A very handsome pinnate-leaved palm having the ends of the pinnæ irregularly toothed, the tooth on the upper edge being about 1½ inches in length. It thrives well in a conservatory, but its hardihood in full exposure to the sun has not been as yet generally proved.

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[*] *Dypsis,* from *dupto,* to dip.

[†] *Elaeis,* from *elaia,* the olive. Oil is expressed from the fruit as from the olive.

[‡] *Euterpe,* from *euterpes,* well-pleasing, one of the nine muses.

[§] *Oleracea,* culinary.

[‖] *Geonoma, geonomos,* skilled in agriculture. Application not apparent. Should the word not be *geonema,* in allusion to the slender stems ?

[¶] *Gracilis,* graceful.

[**] *Hydriastele, hydria,* water, *stele,* a column ; in allusion to the tall stems growing near springs.

[††] *Kentia,* in honour of Lieut.-Colonel Kent.

HYOPHORBE* VERSCHAFFELTII

Is truly described in Nicholson's Dictionary as having leaves 4 to 6 feet long nearly erect, pinnate, gracefully arching at the top. The pinnæ are linear, lanceolate, acuminate, 1½ to 2 feet in length and 1 inch broad with a white midrib. The sheaths of the leaves form a triangular columnar stem. Graceful specimens may be seen in conservatories in Indian gardens, but it grows very slowly.

HYPHANE† THEBIACA,‡ *The Doum Palm of Upper Egypt.*

This palm has fan-shaped leaves and is remarkable for the long, smooth stem dividing into 3 to 4 branches at a considerable distance from the ground. There is a fine specimen in the Bombay cemetery at Sewree. As a garden plant it is not very attractive, as it takes several years to attain graceful proportions. There are several fine young specimens in the Public Park at Baroda and at Poona.

LATANIA§ VERSCHAFFELTII, *Latania aurea.*‖

A fan-leaved yellowish tinted palm having circular leaves deeply incised, the ribs of the segments yellowish and th petiole of an orange colour and smooth, and from 2 to 4 fee long. In this climate it proves of slow growth, but bears fu exposure well.

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[*] *Hyophorbe*, hog's food, in allusion to the fruit being eaten by hogs.

[†] *Hyphæne*, from *hyphaino*, to entwine, in allusion to the fibres of the frui

[‡] *Thebaica*, from *Thebes*.

[§] *Latania*—its native name at Mauritius is Latanier.

[‖] *Aurea*, golden.

LICUALA[*] PELTATA,[†]

A dwarf palm native of mountainous parts near Chittagong. Its leaves are fan-shaped, circular, and divided to the base into 20 to 25 wedge-shaped plaited portions, which are abruptly cut off and toothed leafstalks nearly triangular, the sides armed with strong, sharp, smooth, recurved thorns. It thrives in a conservatory on the plains and having the stalk inserted within the margin.

LIVISTONA[‡] CHINENSIS,[§] *Livistona Mauritiana.*

This is perhaps the commonest and finest fan palm in Indian gardens. Its grand fan-shaped leaves gracefully disposed on long petioles armed with short recurved spines and rising from a net-work of brown fibre render it very attractive. The length of the petiole varies with the position of the plant being longer in slight shade than in the open. This palm does well with ordinary border treatment throughout India if watered freely during dry weather.

MARTINEZIA[||] CARYOTIFOLIA.[¶]

A palm having pinnæ resembling *Caryota urens*, but armed on the backs of the leaves, the petioles, and stem with long black spines. It thrives in the moist equable atmosphere of the conservatory in the Botanical Gardens, Calcutta.

OREODOXA[**] REGIA.[††]

A very grand pinnate-leaved palm with leaves 5 to 6 feet in length having pinnæ 12 to 18 inches in length and one in breadth, forked at the apex, bright green, and arranged in opposite groups of 2, 3, or 5. The lowest pinna is often produced into a long pendulous whip 3 to 5 feet in length, and in medium-sized plants this is the most easy means of determination. This palm is not as common as it might be, as it thrives in a great variety of climates and the landscape effect of an avenue of this species is very grand. Fully developed avenues of this palm are among the chief ornaments of the Botanical Gardens at Calcutta and Paradeniya, Ceylon, and good specimens may be seen in the Victoria Gardens, Bombay, and at Poona. At Calcutta there are wide and straight and another narrow and winding, and in either case the effect is grand, although it grows well in a dry climate. Grand results have hitherto been attained only in moist districts, and at Poona it shows a fondness for abundant water.

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[*] *Licuala*, from its native name in the Moluccas.

[†] *Peltata*, having the leaf-stalk inserted within the margin.

[‡] *Livistona*, in honour of P. Murray, once of Livingston, near Edinburgh.

[§] *Chinensis*, from China.

[||] *Martinezia*, in honour of Balthassur Martinez.

[¶] *Caryotafolia*, having leaves like *Caryota*.

[**] *Oreodoxa*, *oreos*, a mountain, and *doxa*, glory.

[††] *Regia*, royal.

PHŒNIX[*] RUPICOLA[†]

Is one of the most graceful of the smaller palms. It developes a stem very slowly, "and wide-spreading, arching, pinnate leaves broadly lance-shaped in outline with long narrow pinnæ," which are unfolded and display a bright green surface with a pale-coloured margin. In the Calcutta Botanical Gardens there are many fine specimens with stems about 5 feet in height growing freely in the deep alluvial soil of that garden with occasional watering.

PHŒNIX TENUIS.[‡]

The palm bearing this name is to be found in several o our nurseries. It differs little from the common date palm an grows well under the conditions suitable for that tree.

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[*] *Phœnix*, the Greek name of the date tree, used by Theophrastus.

[†] *Rupicola*, rock-loving.

[‡] *Tenuis*, narrow.

PHŒNIX DACTYLIFERA,* *Kujjoor.*

Under this name we allude to the trees raised from date seeds, which are plentiful in Western India, and do not ripen dates, but are very useful for toddy and are commonly called *Sindee*, and include the species or variety *Phœnix Sylvestris*, Roxb. A plantation of this plant in full toddy-bearing is at present a very valuable property if within easy distance from a market.

The soil required is rich alluvial or black with moving water at about ten feet from the surface or with irrigation and thorough under-ground drainage from a bed of gravel not less than six feet below the surface.

The seeds should be sown when quite fresh, without removing the pulp, on a bed of rich loam dressed heavily with leaf mould. When six inches high the little plants should be put out eighteen inches apart in carefully prepared nursery beds, and grown carefully till four feet high, then transplanted to their permanent quarters, which may be in lines thirty feet apart with twenty feet between each tree in the line. The ground should then be kept under irrigated crops for two years to get the young trees established.

The attempt to grow dates in Western India has often been made, but with no success so far. Date trees are propagated by removing the shoots which come out near the base of the stem, and probably are only select varieties of the tree we raise from date seeds assisted by a dry climate while in fruit—a condition which may be found in a few limited spots in Northern India, but throughout the country generally would be disastrous, because the fruit-ripening season occurs during our rainy season and the probabilities of a failure of the rainy season are not sufficient to induce people to plant date trees in the hope of getting a crop during a famine year only. It will be understood that *toddy* and dates are not obtained simultaneously.

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* *Dactylifera*, date-bearing.

PHŒNIX ACAULIS[*]

Is a very graceful small palm of a delicate style of growth that renders it a special acquisition in gardens. It is not absolutely stemless; in its native habitat plants with stems 10 feet in height are common, but those must be of considerable age as a fine specimen at Ganesh Khind known to be at least 20 years old has a stem 3 feet in height. Its leaves resemble wild date leaves in shape, but are smaller and of a bright glossy green.

RHAPIS[†] FLABELLIFORMIS,[‡]

From South China, is a palm about 4 feet in height having small fan-shaped leaves divided to the base into about 9 linear segments irregularly and abruptly cut off at the ends.

It thrives in moist shade, and sends up numerous stems, which are useful for cutting for table decoration and as canes. It is propagated by division.

TRACHYCARPUS[§] FORTUNEI, *Chamærops Fortunei.*

A very handsome, dwarf, fan-leaved palm having leaves semi or bicular and flabellate, 1½ feet in length and breadh the segments parted half way or more down, ¾ to 1 inch broa and pendulous at the tips. It needs protection from stron sunshine when grown in the plains.

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[*] *Acaulis*, without a stem, apparently.

[†] *Rhapis*, a needle.

[‡] *Flabelliformis*, fan-shaped.

[§] *Trachycarpus*, *trachys*, rough, and *carpus*, fruit.

TRACHYCARPUS EXCELSUS,* *Chamærops excelsa.*

A very pretty dwarf fan palm distinguished by, in young specimens, the petioles being above loosely concave and below convex, about 1½ feet long and having the margin armed with small regular teeth set close together. It thrives well in a conservatory.

THRINAX† RADIATA.‡

A dwarf fan palm having circular leaves with the leaflets united about half their length, and in some of the leaves the lowest pinnæ remain united, making the leaf peltate. Small specimens may be seen in conservatories in both moist and dry districts.

WASHINGTONIA§ FILIFERA.||

A grand palm native of South California having large circular fan-shaped leaves with the segments separated half way down and the margins fringed with numerous white threads. The petioles are armed with stout hooked marginal spines, which are partly curved forward and partly backwards. This palm is of recent introduction, and as yet is not to be seen in many gardens, but will doubtless become popular because it bears the full sun in the dry air of the Deccan. The plant is of comparatively rapid growth; one at Poona, planted at the same time and side by side with *Livistona Mauritiana*, is now twice as large as that species. Evidently pot treatment and shade do not suit it.

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* *Excelsus*, tall.

† *Thrinax*, a fan.

‡ *Radiata*, rayed.

§ *Washingtonia*, in honour of George Washington, the great American patriot.

|| *Filifera*, thread-bearing.

PANDANACEÆ,*

The Screw Pine Family.

Is a small group of plants represented by the familiar *Pandanus odoratissimus, Keura.* The family enjoys a very rich sandy soil, with abundant water throughout the year and is propagated by seed or division. The plants freely produce large aerial roots bearing on the end the root cap (*pileorhiza*), which is one of the chief distinctions between the root and stem.

PANDANUS JAVANICUS† VARIEGATUS.

In a sandy soil with abundant water this plant is very ornamental if in an isolated position, where its gracefully disposed leaves may be seen to advantage. Its leaves are 3 to 5 feet by 4 inches at the broadest part, gradually decreasing to a fine point, deeply channelled. The spines on the margin turned forwards; on the back, the spines are turned forwards on the upper part of the leaf, but near the base they are turned partly forwards and partly backwards.

PANDANUS AMARYLLIFOLIUS.‡

A very dwarf species entirely spineless or with a few very faintly developed spines on the upper inch of the leaf. The leaves are 15 × 1 inch, and "tending to be [illegible]e-nerved," more blunt-pointed than the others and of a bright deep green. This very handsome species is not as much known as it should be, considering that Roxburgh wrote that it was in the Calcutta Botanical Garden, 80 years ago. It is very suitable for table decoration, because if a side branch is taken off and potted, it makes a graceful ornament. It appears to be scarce in gardens throughout the country, but is plentiful at Ganesh Khind. Abundant moisture is the only special requisite in growing the plant, and slight shade is desirable to bring out the rich green colour.

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* *Pandanus*, from *pandang*, the Malayan name of the genus.

† *Javanicus*, from Java.

‡ *Amaryllifolius*, amaryllis leaved.

PANDANUS CERAMICUS.*

A very fine Java species of slow growth having leaves 5 feet by 4 inches of a pale green with dark ceramic markings, with spines near the base pointing backwards, and those near the apex pointing forwards.

PANDANUS UTILIS†

Has leaves 3 to 4 feet in length, upright or gracefully recurved, margins and dorsum thickly armed with small deep red spines.

CARLUDOVICA‡ PALMATA§

Much resembles a fan palm with the leaves rising from the root. If treated as given under PALMACEÆ it thrives well and proves highly ornamental. Panama hats are made from the leaves of this plant.

HYDROCHARIDEÆ.

The Frog Bit Family.

This family includes some water-weeds that should be cultivated in small ponds in every garden, because, as Oliver observes--"The submerged leaves of several species of this family are well suited to show the rotation of the cell-sap in their individual cells. To observe it place thin longitudinal sections or the membranous margin of a leaf under a high magnifying power." This is not clearly apparent at all seasons, but during the months of February and March it may be seen in *Vallisneria* through a microscope with a ¼-inch object glass.

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* *Ceramicus*, having regular markings of different colours as are given to pottery

† *Utilis*, useful.

‡ *Carludovica*, after Charles IV. of Spain and Louisa, his queen.

§ *Palmata*, palm-like.

VALLISNERIA SPIRALIS and OTHELIA ALISMOIDES

Are plentiful in quiet streams and thrive in ponds with a little mud at the bottom and the water not quite stagnant.

AROIDEÆ,

The Arum or Aloo Family,

Is easily identified by the Caladium and *aloo kuchoo,* so common in gardens. The group is adapted for one distinct season of rapid growth and a season of more or less complete rest. For all this group a soil rich in decayed vegetable matter is necessary, therefore two parts old leaf mould, one part broken bricks, and one part good loam is suitable. Many species are naturally marsh plants, and all need abundant supplies of water during the growing season from May till October. Complete protection from high wind and slight shade.

ALOCASIA.

This group does not go to rest as completely as Caladium, therefore slight watering must be continued from October to April. During the latter month re-pot or give fresh soil and manure, and as soon as the plants have started into vigorous growth, give abundant supplies of water with liquid manure once a week. These plants thrive much better on a bank of rich soil with pot sunk in it to keep water than in pots. *Alocasia Lowii,* which is seldom seen in good condition in this country, is very fine in such circumstance in the conservatory.

AGLAONEMA COMMUTATUM.

A dwarf plant having elliptic pointed entire leathery leaves of a bright green marked with irregular paler lines on the ribs. It thrives with moist conservatory treatment in pots with fibrous rich soil. This plant is particularly suited or the decoration of apartments because a branch may be ·ut and kept in a vase with water, where by frequently :hanging the water the plant may be kept fresh a long time.

AGLAONEMA PICTUM, *A. Mannii*,

May be treated like the above.

ALOCASIA LOWII.

When well grown few plants are more ornamental than this. Its leaves are cordate-sagitate 14 to 16 inches in length, olive green with thick white ribs and deep purple beneath. This plant is rarely seen in the condition it is capable of, as it grows very poorly in pots compared with its luxuriance when planted out in a deep bed of rich soil in the conservatory and watered freely.

ALOCASIA JENNINGSII.

A species attaining 6 to 8 inches, having peltate, cordate-ovate, acuminate leaves and a green ground colour marked with large wedge-shaped blotches of dark brown between bright-green veins: a very fine, free-growing, dwarf Arad.

ALOCASIA MARSHALII

Much resembles the above in size and habit, but is distinguished by a broad central silvery band.

ALOCASIA CUPREA, *Alocasia metallica.*

A slow growing plant with leaves 12 to 18 inches in length of a rich bronze colour on the upper and purple on the lower side.

To attain good development a close moist conservatory is necessary.

AMORPHOPHALLUS CAMPANULATUS, *Soorun*, and AMORPHOPHALLUS RIVIERI

Are treated like Caladium.

ALOCASIA SANDERIANA.

"A remarkably handsome and truly grand Arad from the Eastern Archipelago, forming one of the finest of variegated-leaved stove plants. The colour of the young leaves is bright glossy green, and on the older leaves the surface has a metallic blue reflection. The leaf-blade is arrow-shaped, the front portion with about three triangular lobes on each side the basal portion with one or two smaller lobes; the thick costa and the stout cross veins are white, conspicuously bordered with ivory-white, the margins also being white."

ANTHURIUM ANDREANUM.

"The flower-spathes of this magnificent Araceous plant are heart-shaped and of a most brilliant scarlet colour, the surface irregularly corrugated and traversed by deep sinuous veins, the spadix is ivory-white at the base, and greenish-yellow at the tip. An extremely attractive plant, each inflorescence remaining in perfection about three months."

ANTHURIUM CHELSEIENSE

Is described by Bull as follows—"An extremely handsome hybrid between *Anthurium Veitchii* and *Anthurium Andreanum* with leaves resembling those of the first named. The spathes are broadly cordate, cuspidate at the apex, about 5 inches long by 3½ inches broad, of an intense shining, rich crimson colour. The spadix is about two-thirds the length of the spathe, and slightly tapering, the basal part white, the tip tinged with a yellowish shade. From the free manner in which the beautiful spathes are produced and the long time which they last in perfection, combined with the ornamental character of the foliage, this handsome hybrid is a most desirable acquisition."

ANTHURIUM CARNEUM

"A handsome and attractive new hybrid between *Anthurium ornatum* and *Anthurium Andreanum*. The spathe is heart-shaped, from six to seven inches long and five to six inches broad, and is of a charming rosy-carmine colour. Of vigorous growth, this splendid variety freely produces its grand flowers, each spathe remaining in beauty several months, thus rendering it of the greatest value for decorative purposes."

ANTHURIUM INSIGNE.

"A noble and striking Aroid imported from the United States of Colombia. The leaf-blade is three-lobed, deflexed at first, the middle lobe lanceolate, and the two lateral lobes semi-ovate. The young leaves have a bronzy tinge before taking on the full green of the mature foliage."

ANTHURIUM INTERMEDIUM.

We have in this the result of the inter-crossing of *Anthurium hybridum* and *Anthurium crystallinum*. The leaf-blades are deflexed, over a foot long, oblong-ovate, cordate at the base, with an open rounded sinus, the upper surface of a velveti green, with a slight olive tinge, the costa and principal veins being whitish. The spathe is lanceolate and of a pale reddish hue with a rosy red spadix."

ANTHURIUM LIEVENSII.

"A bold and striking Aroid. The leaf-blades are ovate-acuminate, with rounded basal lobes and an acute sinus, and are traversed by raised slightly-curved veins. It has a reddish-tinted spathe and bright red spadix."

ANTHURIUM SPLENDIDUM.

"A strikingly beautiful stove Aroid imported from South America, quite distinct from anything previously in cultition, the surface of the cordate leaves being remarkably peculiar. The course of the nerves is marked by a broadish band of deep lustrous velvety green, the intervening spaces being of a pale yellowish green. The leaf surface is scabrous, and the portion between the ribs strongly bullate, as it is raised in papillose blisters."

CALADIUM.

This genus is now represented in gardens by a great number of varieties which are very effective garden plants. The tubers start into growth in May, and at this time should be repotted with the compost given above. At first give one thorough watering to settle the soil, afterwards water very slightly until the leaves have made some growth, then gradually increase the supply, giving liquid manure once a week as soon as the pot is full of roots. By October, if the leaves are turning yellow, gradually reduce the supply until the foliage has quite dried up, then lay the pot away in a shady place cover with straw, and keep dry till May next.

The following is a selection of choice varieties of Caladium from the list of Mr. W. Bull, King's Road, London, with prices in England :—

Adolphe Adams.—Green, densely speckled with white ; rose-coloured mid-ribs. 2*s*. 6*d*. & 3*s*. 6*d*.

Adolphe Andrien.—A very attractive variety with large, richly-coloured foliage. 3*s*. 6*d*.

Agrippine Dimitry.—White ground, green margin and veins, pink centre. 3*s*. 6*d*.

Aida.—Transparent ruddy rose tissue with a network of green ribs. 7*s*. 6*d*.

Albo-luteum.—Yellowish white with green tint, very long leaves. 5*s*.

Alcibiade.—Crimson-rayed centre, surrounded with pale green and blotched with pure white green margin. 3*s.* 6*d.*

Alfred Mame.—Carmine-red, bordered with white and spotted with rose. 7*s.* 6*d.*

Alphand.—Green, spotted with red; crimson centre. 2*s.* 6*d.* & 3*s.* 6*d.*

Alphonse Karr.—Carmine centre and red spots. 3*s.* 6*d.*

Amœnum.—Transparent rose, with red ribs, violet-rose veins, green margin. 5*s.*

Anna de Condeixa.—Rose centre, with clear green margin, and white, yellow, and dark green zone. 5*s.*

Argyrites.—Pale green with white spots. 1*s.* 6*d.* & 2*s.* 6*d.*

Artemise.—Silvery white with rosy-crimson ribs. 3*s.* 6*d.*

Auber.—Green ground, marked with white spots and central pink ones. 3*s.* 6*d.*

Auguste Carpentier.—Carmine-red centre, surrounded with reddish-maroon and margined with golden green, very effective. 7*s.* 6*d.*

Auguste Lemoinier.—Soft green centre and rosy-crimson rib and veins. 3*s.* 6*d.*

Aurore Boreale.—Dark red, spotted with bronzy-green, reddish carmine ribs. 10*s.* 6*d.*

Baraquinii.—Crimson centre, dark green margin. 2*s.* 6*d.* & 3*s.* 6*d.*

Barillet.—Green, bright rosy-crimson centre and ribs. 3*s.* 6*d.* & 5*s.*

Baronne James de Rothschild.—Young leaves of a bright rose colour: the more matured foliage soft rose with red veins. 7*s.* 6*d.*

Beethoven.—Ground colour white, intersected and veined with green, centre rib delicate rose. 2*s.* 6*d.* & 3*s.* 6*d.*

Bellone.—Centre carmine-rose, shading off to reddish maroon and metallic brown. 7*s.* 6*d.*

Burel.—Dark bluish green veined bright rose, marked with rosy violet and spotted orange-red. 3*s.* 6*d.*

Calypso.—Dark green margin, bright crimson centre and veins, and pink spots. 3*s.* 6*d.* & 5*s.*

Candidum.—White ground with strongly marked ribs. 5*s.*

Cardinale.—Brilliant red, dotted with golden yellow and greenish yellow. 10*s.* 6*d.*

Ceres.—Rich green with rosy salmon centre. 5*s.*

Chantinii Fulgens.—Rich metallic green, with crimson centre and white spots. 5*s.*

Charlemagne.—Large rosy-red leaves, nerves dark red. 15*s.*

Charles Verdier.—Fine green, with blush-pink centre and spots. 2*s.* 6*d.* & 3*s.* 6*d.*

Chelsoni.—Bright glossy green, suffused with brilliant red and blotched with crimson. 2*s.* 6*d.* & 3*s.* 6*d.*

Comtesse de Condeixa.—White ground shaded rose; carmine red veins; narrow green margin. 5*s.*

Comtesse de Maille.—White ground, veined with bright rosy red and green. 5*s.*

De Candolle.—Rich green, rose-coloured spots and creamy white centre rays. 3*s.* 6*d.*

Devinck.—Leaves heart-shaped; delicate pink centre ribs, with white spots. 3*s.* 6*d.*

Dr. Boisduval.—Centre rayed crimson; snow-white blotches on a green ground. 3*s.* 6*d.*

Duc de Cleaveland.—Red centre, surrounded with pea green; red spots. 3*s*. 6*d*.

Duc de Nassau.—Brilliant red centre and ribs, white spots. 2*s*. 6*d*. & 3*s*. 6*d*.

Duc de Ratibor.—Green with red midribs and white spots. 2*s*. 6*d*. & 3*s*. 6*d*.

Duchartre.—Leaf ground white, flushed rose, green veins and red spots. 3*s*. 6*d*.

Edouard Moreaux.—Mottled green ground, with lake centre. 3*s*. 6*d*. & 5*s*.

Edouard Rodrigues.—Deep carmine, margined with light green, and spotted with rose. 3*s*. 6*d*. & 5*s*.

E. G. Henderson.—Green, with transparent rose spots and mottled crimson rays and centre. 3*s*. 6*d*.

Elvina.—Bright green, blotched with red; grey centre and veins. 3*s*. 6*d*.

Etoile D'Argent.—Green, midribs and veins creamy white, shaded grey. 5*s*.

Eucharis.—Rose centre with violet reflections margined with bright green. 5*s*. & 7*s*. 6*d*.

Felicien David.—Carmine centre, surrounded white, and veined with red on green ground. 3*s*. 6*d*. & 5*s*.

Ferdinand De Lesseps.—Dark carmine-red ground with violet-rose ribs and deep green spots. 5*s*.

Gaze De Paris.—Translucid leaves, green ribs. 5*s*.

Gerard Dow.—Pale yellow ground, carmine midrib, deep red veins, narrow green margin. 10*s*. 6*d*.

Golden Queen.—Pale golden yellow. 5*s*.

Helevy.—White midribs and crimson blotches. 3*s*. 6*d*.

Herold.—Dark carmine veins, surrounded by light green, blotched pure white. 3*s*. 6*d*.

Ibis Rose.—A magnificent variety, with beautiful rich rose-coloured foliage. 15*s*.

Imperatrice Eugenie.—Light green with greyish pink centre and rose-coloured veins. 2*s*. 6*d*. & 3*s*. 6*d*.

Isadora Leroy.—Rich metallic green with crimson-red centre rays. 3*s*. 6*d*.

Jules Duplessis.—Bright rose centre, shaded with red and bordered with green. 5*s*.

Jules Putzeys.—Rich green with crimson midrib and veins and red spots; centre mottled grey. 3*s*. 6*d*. & 5*s*.

Keteleer.—Spotted white, upon emerald-green, large crimson centre. 3*s*. 6*d*.

Laingii—Reddish carmine centre; the whole of the leaf sprinkled with white. 3*s*. 6*d*.

La Perle du Bresil.—White delicately tinted with rose; midrib and veins dark green. 3*s*. 6*d*. & 5*s*.

L'Aurore.—Orange red, carmine veins, creamy white margin. 10*s*. 6*d*.

L'Automne.—Creamy white, with bluish maculations. 15*s*.

Leopold Robert.—Rosy white ground; carmine-red veins shaded with reddish-brown; green margin. 5*s*.

Lepeschkinei.—Leaves marked with rich rose spots; bright red centre. 3*s*. 6*d*.

Leptay.—Leaves marked with white and beautifully veined with rosy violet. 3*s*. 6*d*.

Le Titien.—Ground network of red and rich green, pure magenta ribs. 7*s*. 6*d*.

Louise Duplessis.—Red rays and veins on a white ground; green margin. 3*s*. 6*d*.

Luddemanni.—Deep crimson ribs; the leaf blotched with magenta and white. 3*s*. 6*d*.

Madame Alfred Bleu.—Deep green, with large white blotches and broad crimson-scarlet veins. 3*s*. 6*d*. & 5*s*.

Madame Alfred Mame.—Light green, covered with large white spots; rosy carmine centre. 3*s*. 6*d*. & 5*s*.

Madame Dombrain.—Centre and ribs pale yellowish green, shaded rose, and spotted with white and rose. 3*s*. 6*d*.

Madame FritzKœchlin.—White ground, violet-rose ribs, green veins. 3*s*. 6*d*.

Madame Houllet.—Large leaves, with clustering bluish-white blotches. 3*s*. 6*d*.

Madame Hunnebelle.—Leaves veined with garnet on white ground and margined with green. 3*s*. 6*d*. & 5*s*.

Madame Jules Picot.—Translucid rosy violet leaf. 15*s*.

Madame Leforge.—Centre and ribs reddish crimson with green margin. 3*s*. 6*d*.

Maddme Lemoinier.—Pale rose with darker ribs; veins and centre encircled with creamy white. 5*s*.

Madame Mitjana.—Transparent reddish-crimson, rose centre. 13*s*. 6*d*.

Madame T. De Vigier.—Rosy white carmine nerves. 15*s*.

Marquis de Caux.—Red centre and veins with rose blotches on margins. 3*s*. 6*d*.

Mars.—Clouded crimson centre, the whole leaf spotted with crimson. 3*s*. 6*d*.

Maxime Duval.—Fine broad crimson centre and ribs, green margin. 3*s*. 6*d*.

Max Kolb.—Light green ground with pale centre and ribs, green margin. 3*s*. 6*d*.

Mercadante.—Pale copper-coloured centre and veins, bordered with green. 3*s*. 6*d*.

Meyerbeer.—White leaf ground, green veins and red midribs. 2*s*. 6*d*. & 3*s*. 6*d*.

Minerve.—Silvery white midrib and rays, surrounded with greyish white; green margin, with white spots. 5*s*.

Monsieur A. Hardy.—Rich reddish carmine veins on white ground, tinted with rose and spotted with green. 5*s*.

Monsieur D'Halloy.—Delicate rose, bright rose centre, carmine and green veins. 7*s*. 6*d*.

Monsieur J. Linden.—Fine large whitish leaf with metallic reflections, coral-rose veins and reticulated green border. 5*s*.

Mrs. Laing.—White ground; deep rose centre and veins, green margin. 5*s*. & 7*s*. 6*d*.

Napoleon III.—Flamed crimson centre with forked rays and carmine-red spots. 3*s*. 6*d*.

Onslow.—Deep rosy crimson centre with broad green margin, spotted with rose. 3*s*. 6*d*.

Ornatum.—Golden yellow ground; carmine ribs encircled with rosy lake; red-violet veins. 5*s*.

Paul Veronese.—Pinkish white centre, deep scarlet ribs, and green margin. 3*s*. 6*d*. & 5*s*.

Philippe Herbert.—Deep mottled crimson rays and clear green margin, spotted with crimson. 2*s*. 6*d*.

Pictum.—Green, blotched, and spotted with white. 3*s*. 6*d*.

Prince Albert Edward.—Dark emerald green, rich crimson radiating midrib, white spots. 2*s*. 6*d*. & 3*s*. 6*d*.

Princess Alexandra.—Rosy salmon leaf, green centre rib bordered with magenta-crimson; green margin with light pink chain. 3*s.* 6*d.*

Princess of Teck.—Bright orange-yellow, veins suffused with deep red. 5*s.* & 7*s.* 6*d.*

Princess of Wales.—Golden yellow, spotted with crimson 5*s.*

Princess Royal.—Leaves of a golden ground colour with crimson centre. 5*s.*

Pyrrhus.—Centre and ribs deep crimson, pea-green margin. 3*s.* 6*d.* & 5*s.*

Quadricolor.—Centre of leaf pale yellowish green, ribs white, edged rosy crimson, and margined green. 3*s.* 6*d.*

Raulinii.—Rich red centre and veins, finely spotted with white. 3*s.* 6*d.*

Regale.—Silvery grey centre, rosy red ribs, vermilion-red spots. 2*s.* 6*d.* & 3*s.* 6*d.*

Reine Victoria.—Green veins and margins, spotted with white and rich crimson. 2*s.* 6*d.* & 3*s.* 6*d.*

Rouillard.—Green margin, pale green centre, midrib and rays violet-plum; whole of leaf spotted crimson. 3*s.* 6*d.*

Rubens.—Golden green ground, shaded bright red and veined with dark brown. 5*s.*

Rubrum metallicum.—Violet red, rose centre, shaded violet, margin copper red. 15*s.*

Salvator Rosa.—Bright red centre tinted with rosy violet; light green margin. 5*s.*

Sanguinolentum.—Green with white midrib and red spots. 3*s.* 6*d.*

Sieboldii.—Rich green with fiery red crimson-rayed centre and claret-red spots. 3*s.* 6*d.*

Sirius.—Centre scarlet-red, spotted with rosy red and golden green. 7*s.* 6*d.*

Souvenir de Madame Bernard.—Bright red centre, dotted with golden yellow, green, and white; light green border. 7*s.* 6*d.*

Souvenir des touches.—Carmine shaded violet; red veins, rose spots, surrounded with white. 7*s.* 6*d.* & 10*s.* 6*d.*

Souvenir du Docteur Bleu.—Reddish scarlet centre; pale green border shaded with rich red. 10*s.* 6*d.*

Spontini.—Pea-green, with white spots and rosy pink ribs and veins. 5*s.* & 7*s.* 6*d.*

Tricolor.—Grey-green with red-lake centre and carmine midribs. 5*s.* & 7*s.* 6*d.*

Van Dyck.—Transparent rosy-lake, pale rose centre, grey green margin. 5*s.*

Verdi.—Crimson-lake centre, with small green zone and apple-green margin. 5*s.*

Vicomtesse de la Roquecordan.—Red midrib and rays bordered white; green margin. 3*s.* 6*d.*

Ville de Mulhouse.—Greenish white, shaded rose; rich green centre. 5*s.*

Virginale.—Shining white, veined dark bluish green; a grand variety. 5*s.* & 7*s.* 6*d.*

DIEFFENBACHIA CHELSONI.

A very handsome plant with dark satiny green leaves, the costa marked with a grey band, feathered about one-third across each half of the blade, the surface of which is also freely spotted and blotched with bright yellow-green.

DIEFFENBACHIA PRINCEPS.

A bold and handsome plant of ornamental character. The leaves are dark green with a few scattered yellowish spots and a silvery grey marking running through the centre, that in the upper half of the leaf being most distinctly developed.

DIEFFENBACHIA REGINA.

A very distinct and striking variety from South America. It has oblong elliptic greenish-white leaves, mottled with blotches of pale green, and having a narrow margin and a few streaky markings of a deeper shade. From its distinct markings, the plant is very effective and well entitled to be regarded as the Queen of the Dieffenbachias.

DIEFFENBACHIA REX.

If *D. regina* may be considered as the Queen, we have in this the King of the genus—a very handsomely marked plant of free and vigorous habit. The leaves are of a very deep green colour, thickly covered with oblique-elongate angular white blotches, which take the same direction as the venation, and are here and there slightly veined and suffused with green. It was introduced from South America.

DIEFFENBACHIA TRIUMPHANS.

A very desirable ornamental plant from the United States of Colombia. The leaf-blades are dark green thickly covered with large irregular blotches of a yellowish-green, the variegation showing on both surfaces of the leaf.

NEPHTHYTIS PICTURATA.

A very distinct and ornamental stove Aroid from the Congo, remarkable for the handsome variegated character of its foliage. The plant is stemless, with terete green petioles growing about a foot high, and broadly ovate-hastate leaves, which are abruptly pointed at the apex; the colour is bright green with a silvery-white variegation between the nerves. This variegation is peculiar and quite unique in character, forming a pattern resembling in outline the tips of fern fronds laid between the nerves, with their points all directed towards the base of the leaf.

PHILODENDRON CARDERI.

This exquisitely coloured Arad is a native of South America. The leaves are of a dark shaded bottle-green, with a satiny lustre, the principal ribs being marked out by bright green lines of a glaucous or metallic hue; at the back the leaves are of a shaded wine-purple, the course of the veins being marked by broad lines. The glossy shaded satiny surface of the leaves imparts to them a wondrous degree of beauty.

PHILODENDRON NOBILE.

A distinct species from South America. It has obvate-lanceolate leaves of a firm leathery texture. The large and attractive inflorescence is axillary, the lower portion of the handsome spathe being of a deep rosy crimson colour, both inside and out; the upper part white internally, outside prettily marked with deep-rose stellate spots, the larger ones being surrounded by numerous smaller dots of the same colour.

POTHOS AUREA.

When adhering to the stem of a tree in moist districts or growing up a post in a conservatory in dry districts few plants are more showy than this one. Its alternate leaves attain 15 inches by 10, are cordate, ovate, acute, thick, leathery, and are irregularly marked by bands and blotches of yellow varying in intensity from cream to orange. In the cemetery at Sewree, Bombay, which is close to the sea, very fine specimens may be seen.

POTHOS FLEXUOSUS.

It has flattened stem, leaves being alternately directed to the right and to the left, the larger ones six inches long; the lamina oblong, with an acuminate apex, pale green with a few alternate elongated ribs. From the peculiar character of the leaves, which lie flat upon the surface it climbs over, it is well adapted for covering walls or for other ornamental purposes.

POTHOS NITENS.

A distinct-looking stove plant, with climbing terete stems, which hold fast to any surface with which they come in contact by means of their adventitious roots. The leaves are ovate-acute, slightly and unequally cordate at the base of a dark shining bronzy-purplish green. This will prove an effective and attractive species for covering the walls and trellises in our stoves. It has been imported from the Eastern Archipelago.

REMUSATIA VIVAPARA.

A very beautiful Arad producing one or two large cordate, pointed, bronze-coloured leaves having the leaf stalk inserted within the margin (peltate) as in the common varieties of caladium. This plant is indigenous to forests on the western ghauts and is abundant in forks and crevices of trees in the Khandalla grove. There the roots may be collected during the flowering time in May, as they are at that time conspicuous by the large yellowish-white reflexed spathe, and planted with leaf mould and moss in suspended baskets. It propagates itself by vivaparous bulbils, which are produced abundantly about the end of the rainy season.

RICHARDIA ÆTHOPICA, *Richardia Africana, Nile Lily.*

A handsome marsh plant having large, oblong, cordate, radical leaves and large pure white spathes enclosing the spadix bearing minute flowers. On the margin of a tank in shallow water this species grows freely and may be propagated by division. Like many other water plants it bears a considerable range of climate. Good specimens may be seen at the Baroda Public Park and at the Ootacamund Government Gardens.

SCINDAPSUS ARGYRÆUS

A creeping-stemmed Arad, the stems fixing themselves by rooting as they advance in growth. The leaves are glabrous, the juvenile ones ovate acuminate, very silvery and glossy on the surface; the older and more mature leaves are pinnatified and become silvery on the surface like the younger ones.

SCHISMATOGLOTTIS DECORA.

A dwarf stove perennial, with very short stems, and ovate acuminate leaves, the upper surface of which is green, decorated with thickly distributed oblong silvery grey blotches covering fully half the area, the under surface being pale green. It has been imported from Borneo.

SCIZOCASIA PORTEI

Is a very large growing Alocasia-like plant having deeply divided leaves. Its treatment is similar to Alocasia.

XANTHOSMA VIOLACEA.

A strong-growing Alocasia-like plant of a deep purple colour, paler beneath. It needs rich soil and abundant water and slight shade.

XANTHOSMA LINDENI

Resembles the above but is distinguished by a pale purple hue set off by the midrib, large veins, and often large patches of the leaf being of an ivory white colour. Its culture resembles the above.

XANTHOSMA HYPOPHYLLUM

Is easily distinguished by a remarkable small leaf attached to the midrib on the lower side near to the apex of the normal leaf.

CYPERACEÆ,

The Sedge Family.

A group of plant closely allied to the grasses, but distinguished by the edges of the leaf sheaths being joined round the stem instead of open, as in grasses, and angular stems.

CYPERUS* ESCULENTUS.†

This little plant greatly resembles one of the most troublesome weeds, *Cyperus rotundus*,‡ the *Nagar mootha*, *Mootha*, *Shuka-tunga*, but the roots of the esculent sedge have a fine filbert-nut-like flavour, while those of *Nagar mootha* have a strong perfume and are used with fragrant gums in the manufacture of *ood-buttee*, a composition which gives a pleasant perfume when burned.

GRAMINEÆ.

The Grass Family.

This large group of plants has been characterised as the most useful of all the families of plants to man, and in garden arrangements there are few objects more graceful than clumps of bamboo on the banks of tanks. The young branches are very beautiful when combined with lilies in house decoration, and the flowering branches of many grasses are very pretty and durable when other flowers are scarce. Any ordinary rich garden soil with abundant water and good drainage will grow garden grasses. Propagation is effected by dividing the root-stock, by layerings, cuttings, and seeds.

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* *Cyperus*, from the Greek appellation given to one of the genus.

† *Esculentus*, edible.

‡ *Rotundus*, round.

Among variegated grass,

POA VARIEGATA is very ornamental in the conservatory;

ARUNDO DONAX VARIEGATA is fine when planted on a small island in a pond with poor sandy soil—in some soil the variegation is quickly lost; and

PHALARIS ARUNDINACEÆ VARIEGATA looks well on a shady moist bank.

ARUNDO DONAX and SACCHARUM PROCERUM are very fine plants for clumps on large lawns.

For lawn grasses we have only one native plant that is fairly suitable, *Cynodon dactylon, Hurrialee* or *Dhoorwa*. *(For directions for making a Lawn see page 91.)*

Hurrialee grass needs a considerable proportion of salt in the soil to thrive well. A fine loamy soil rolled frequently produces short close growth suitable for a lawn, and the same kind of soil heavily manured is desirable for producing hay. This plant produces the best quality of hay that is known in India. It is difficult to gather seed; therefore, when procurable, it is costly. For propagation the undergrown stems may be chopped up and mixed with a plaster of dung and earth, then spread on the smooth surface covered with ½ inch of sandy soil and rolled in.

PANICUM* ALTISSIMUM,† *Guinea Grass.*

A very useful fodder grass specially suitable for a sandy soil under irrigation and well adapted to occupy vacant spots in compounds or on the sides of irrigation channels. It grows freely during the hot season, yielding green fodder during that period of scarcity. This grass is better adapted for horned cattle and mules than for horses.

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* *Panicum*—the old Latin name used by Pliny—from *paniculum*, a panicle, alluding to the usual form of the inflorescence.

† *Altissimum*, very tall.

It may be propagated at any season by dividing the clumps, but most easily during the cold season or by sowing seed during the cold season. Seed is not often procurable in quantity.

ANDROPOGON[*] SCANDENS,[†] *Marwail*,

Is a useful grass for lawns and paddocks; on a deep alluvial soil, if regularly grazed over, it forms a smooth green turf and yields very abundant forage. It is propagated by dividing clumps and planting at the beginning of the rainy season.

BAMBUSA,[‡] *Bamboo.*

Bamboos are very graceful plants and form a grand screen on the windward side of the garden. Any good soil with a free supply of water is suitable. For propagation seed is the most convenient when it can be obtained fresh, but as many species of bamboo flower at long intervals, seed is not often procurable; in that case it is necessary to cut down a clump about 3 feet from the ground, dig out the stumps, and plant separately.

BAMBUSA NANA.[§]

A very pretty bamboo attaining 10 feet in height by ¾ inch at the thickest part. It is easy to propagate by dividing the stems during the rainy season and forms an excellent fence in wet districts.

BAMBUSA AUREA[||] VARIEGATA

The stems of this species are richly ornamented with bright golden stripes, which break joint at every node. It is highly ornamental, grows freely on a moist border, and apparently will attain a large size.

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[*] *Andropogon*, from *aner*, a man, and *pogon*, a beard; tufts of hair on flowers.

[†] *Scandens*, climbing.

[‡] *Bambusa*, from *bambu*, the Malay name.

[§] *Nana*, dwarf.

[||] *Aurea variegata*, having golden variegation.

FILICES, *Ferns.*

Ferns love a still, moist atmosphere, and thrive with less light than other garden plants, hence the grace and loveliness that can be imparted to shady confined nooks where light-loving plants would perish.

There are two distinct classes of ferns, evergreen and deciduous. The former are natives of districts and have a considerable degree of moisture in the air all the year round; the latter are found in districts like Western India with abundant rain during a particular season, and the remainder of the year dry. The evergreen species are most valued in cultivation, and are more easy to manage than the deciduous kinds.

Soil.—As frequent watering is necessary and yet stagnant water being very injurious, the soil must be of a nature to receive and absorb what is required and allow the surplus to pass away freely. For this purpose a free admixture of potsherds, broken small, is advisable, and the soil may be composed of one-half good loam, one-fourth decayed leaves, and one-fourth broken potsherds. If the loam does not contain any lime, a small quantity should be added. The drainage at the bottom of the pot must be arranged carefully, keeping the convex sides of the potsherds up to allow a clear passage for the water. Should any worm-casts appear on the surface of the pot, the plant should be turned out and the worms removed, as they very soon stop the drainage at the bottom. The manner in which some of the maiden-hair ferns are grown at Gunesh Khind has some advantages. A board is covered with a compost of one-half very calcareous loam, one-fourth leaf-mould, and one-fourth moss. The compost is laid down about an inch thick; on this is laid the small plants, which are then covered with a thin layer of moss and the whole fastened down firmly with wire netting. A board of this kind may be made of any shape, such as a shield or an oval, and when the plants are well grown may be used to decorate a room by standing against a wall. Maiden-hair ferns grown in this way are often more than a foot long. Four boards may be joined so as to make a pyramid and a vase placed on the top, from which water may trickle over the plants. This, if filled several times daily, will keep the ferns properly watered.

TO RAISE FERNS FROM SEED, *Spores*,

Prepare a compost of two parts fine loam, one part leaf mould, and one sand, and sift through a half-inch sieve; then take a pot not less than six inches in depth, arrange potsherds carefully to a depth of two inches, pack in two inches of soil firmly, leaving two inches vacant at the top. Give a good watering on the top from a fine rose watering pot, taking care not to disturb the soil or cause it to run to one side. When the water has passed through, mix the spores with about 100 times as much fine soil and sow thinly. Cover the mouth of the pot with a pane of glass and place the pot in a saucer containing 1 inch of water. The whole must then be kept in a close frame, and as soon as the young plants are fit to handle lift with the aid of a pen and pot singly in small pots and replace in the close frame. The pot will probably yield several crops, which may be different from each other.

TREE FERNS.

Very beautiful tree ferns grow freely on the Neilgherries, and can be brought from that district during July and August with safety. The fronds and roots are cut off and the stem packed with moss in a box. A twenty days' journey in this condition appears not to harm them. When the stems are received in the conservatory, a bed of broken bricks and potsherds should be arranged to provide very perfect drainage, the stem placed on the drainage, and carefully packed round with a mixture of four parts potsherds or broken bricks, one part good loam, and one part leaf-mould made very firm. The stem should be covered with moss and kept moist by frequent watering. When growth is fully established the soil may be enriched by a surface layer of four inches of leaf-mould.

FUNGI, *The Mushroom Family.*

The members of this family are plants without green colour or any distinction as to stem and leaf and are often seen growing on dunghills. Many are serious pests in the garden, destroying other plants and timber and are to be combated with sulphur. Some are poisonous, but a few are considered very delicate esculents, perhaps the safest is the mushroom, *Agaricus campestris.*

HOW TO GROW MUSHROOMS.

Many attempts to grow mushrooms in India have been made, generally with very little success; but Mr. C. Maries of Durbungah, who is well known for his success in other difficult work, has grown mushrooms well. He describes his system thus:—

Mushrooms can be grown in this country from about October till June. The necessary arrangements are a house or room, dark and closed up from draught and air, a quantity of horse droppings, which should be collected every day fresh from the stables and spread out in a verandah until sufficient has been collected, taking care that the quantity laid together is not sufficient to induce fermentation, then take 20 parts horse-dung, 5 parts cow-dung, and 5 parts good surface loam from an old grass plot, mix all together and gather into a heap for 12 hours. Then it will be ready to arrange in a bed. A convenient size of bed is 8 feet by 4, but exact measurement is not important. Drainage must be provided: for this purpose two inches of ashes, potsherds, or gravel may be used with a coating of cowdung plastered over it and allowed to dry a little. On the drainage a layer of the mixture of dung and soil 14 inches deep should be laid and beaten down hard by a coolee being employed to tramp it for an hour or so. Place a thermometer in a hole in the centre and cover with mats. The heat will rise to 125° F., and about 8 days later will have gone down to 95°. Then insert the spawn in lumps an inch square, about six inches apart, and one inch beneath the surface. Beat or trample down hard again and plaster with a mixture of dung and soil $\frac{1}{4}$ inch in thickness. Cover up with mats and examine about once weekly. If dry give a thorough soaking of water. The time required to produce mushrooms varies from 2 to 4 months. When one bed commences bearing another should be prepared at once and spawned from the bearing bed. The new bed will bear about a month or five weeks after spawning and the crop is generally great. If a constant supply is wanted fresh beds should be prepared monthly from August till May, and the last made may be kept over till the following season. The old beds often bear again well in October or November, and if space is available may be preserved.

The chief difficulty is to get good mushroom spawn: when imported, it often spoils during the voyage; therefore, when a house has been used successfully for growing mushrooms it should be valued, because the spores will abound in it and less trouble in spawning will be met with in such a place than in a new position.

MUSHROOMS FROM DECAYING RICE STRAW.

Mr. Ridley at Lucknow, in following a plan proposed to him by Major Pitcher, has been successful in growing mushrooms on decaying rice straw, "payrah":—

"The plan followed was simply forming the straw into flat oblong heaps, two feet deep and four feet wide, and treading moderately firm. This was done in the rains, when the material was moist, and after the beds had settled down and got thoroughly saturated by rain, the mushrooms began to come up; and so long as the weather was showery and damp there was a daily yield, but none appeared in breaks and dry weather. I may add that the site was on the north side of some trees and completely shaded from the sun."

In the Deccan wild mushrooms are abundant on open pastures during showery and damp weather, but the short time such weather lasts makes the system of cultivation detailed by Mr. Maries desirable.

WAS THE MANNA OF SCRIPTURE A MUSHROOM?

Much learned writing has been done on the identification of the Manna of Scripture. A *resumé* of the subject may be found in the Encyclopædia Britannica, Ed. VIII., Vol. XIV., but no suggestion that the manna was a mushroom appears in that or any other work I have access to.

The manna appeared suddenly on the ground in the mornings in immense quantities and disappeared as the sun rose high. It was small, round, and of the colour of olibanum, a dull white. It was sweet, wholesome food, and if kept until the following day it was full of worms. The Isrealites enjoyed it at first, but soon began to complain. So far the description is that of a mushroom. The size is said to have been that of a seed identified as coriander, but the vernacular name appears to be the only ground of identification, and it is well known that in many instances such names are unreliable.

The following notes have been omitted from their proper order:—

VITACEÆ.

CISSUS DISCOLOR.

A very fine conservatory climber, native of the Dang forest, but the original species has little of the rich colouring of the cultivated plant. The leaves are cordate, oblong, pointed, with bristly serratures; the upper surface is bright velvety green and spotted or mottled with white, the underside is deep red-purple; both surfaces as well as the angular branches are smooth. The flowers are small yellow produced profusely during the cold season. Conservatory treatment with abundant watering during the rainy season and little during the cold and early part of the hot season is suitable. The plant should be cut well down yearly, and be propagated by cuttings inserted in September.

VITIS AMAZONICA.

A pretty conservatory climber having oval, pointed, smooth leaves, red beneath, with silvery veins above; in treatment it resembles *Cissus*.

VITIS ALBO-NITENS

Has oval, oblong, pointed leaves, heart-shaped at the base, shining on the upper side and suffused with a brilliant silvery white tone of colour. In the Victoria Gardens, Bombay, this pretty climber may be seen clothing a shaded wall with its luxuriant foliage; it evidently enjoys a moist atmosphere and slight shade.

SIMARUBEÆ

Is a group of trees with bitter bark, and is often of an imposing character from the large size of their leaves: the flowers are small and usually diclinous (the sexes in distinct flowers).

AILANTHUS GLANDULOSA.

A lofty tree native of China with alternate pinnate leaves often 3 feet in length on vigorous trees; the leaflets are large and coarsely toothed and divided very unequally by the midrib.

This tree is valuable for feeding one of the silkworms, *Attacus cynthia*, and is largely grown in America, France, and Italy for that purpose. It is also a favourite street tree in temperate countries, owing to its umbrageous foliage in summer, which falls completely during the cold weather, and might be used for the same purpose in this country with advantage. It may be transplanted safely during January, although of considerable size.

AILANTHUS EXCELSA, *Maharuk, Marook*,

Is a native tree very closely resembling the above and thriving on rocky soil. The flowers are usually diœcious (having the sexes on different trees). A useful road-side tree, but not giving shelter during the cold season.

RUTACEÆ.

BALANITES ROXBURGHII, *Hingota, Hingenbate.*

A small thorny tree widely distributed in dry districts. It thrives on very sandy or gravelly soil, and its thorns and branching habit render it suitable for fencing where few other plants would thrive.

GARDEN CALENDAR FOR WESTERN INDIA.

PEOPLE of experience or practice in gardening have so little faith in Calendars that it is often said the information wanted is never to be found in them; but these " Hints " are not written for people of great experience and there is no doubt that by scanning the Calendar occasionally the attention may be drawn to work that is more fully described in its proper place. It must not be thought that the indicated work should invariably be done *only* at the time stated, as circumstances may prevent it, and in many instances there are other times at which the work noted may be carried out with equal success. The most that can be said is that the time noted in the Calendar is generally suitable for the operations that are mentioned.

JANUARY.

THIS is one of the gayest months of the year in Indian gardens, except in the places where altitude or latitude is great enough for frost to affect vegetation.

Nearly all the gay flowering annuals should be in full beauty and Tea Roses flowering freely. If budding has been neglected earlier, it is not yet too late. Cauliflowers should be ready for cutting, and cabbage, beet, and a great variety of vegetables at their best.

In places where the rainfall is heavy, this is the best time to put in cuttings of roses and other flowering shrubs.

Inarch mango, guava, and pomegranate trees.

Make layers of guava trees.

Sow *Dilpassand* seed.

Watch flowering melons, and if you have a superior sort, fertilize by hand and cover the flower with a piece of fine net to keep off insects.

Beds of caladiums or other tuberous-rooted plants should have a layer of leaves 3 inches thick laid over them to keep them cool, and for this purpose strip the leaves off some cut branches of a tree with small leaves, such as *Cassia Sumatrana*; when dry these leaves take on a golden brown colour, which has a very agreeable effect.

Lay up stores of gravel for paths from the dried up beds of streams.

FEBRUARY.

TEA ROSES that were budded during October should be in fine flower. Thin out the flower buds from newly budded plants, so that they may not exhaust themselves.

Plant seeds of *Victoria regia* and collect roots of *Nymphæa* from dried up tanks. Turn up all ground that is not occupied with crops.

Grapes should be ripening; reduce the supply of water slightly.

Sow *Dilpassand,* cucumber, and celery to be ready at the beginning of the rains. It requires great skill and care to carry through the hot season, but it can be done by covering the ground with leaves or straw, frequent hoeing, and regular watering.

Prune Cissus discolor plants, put in the cuttings, two eyes long, in sand, and keep the old stock dryish till May ; if in a pot, plunge it in the earth in a cool place. Pinch out the points of fruit-bearing shoots of melons and gourds, and fertilize such melon flowers as need that assistance.

Layer litchee and superior varieties of guava. If not already provided lay up stores of surface soil mixed with manure and green weeds to form potting compost.

Send out to collect *Gloriosa* roots from places marked in September last.

MARCH.

PLANT banana offshoots and artichokes. Sow cucumbers and *Dilpassand.*

Prune vines that have given their fruit, and keep them dry till the rains come on.

Turn up a second time all unoccupied ground, and look after manure to be put in at the end of May. Put in cuttings of roses, geraniums, and such like plants, if they have been of neglected earlier.

Cut away the bunch of unexpanded flowers at the end of he fruit stalk of bananas and give the trees support, to prevent their being blown over by the usual midsummer storms.

Reduce supply of water to a part of the stock of roses, jasmine, and orange trees. See that budding ties have all been removed, and that the wire or string that fastens labels is no cutting off the heads of plants. The labels attached to all lately budded rose trees should be removed from the main stem to one of the branches, where they are not likely to d great mischief if neglected.

Get in supplies of gravel for garden paths to be laid down at the beginning of the monsoon.

Fertilize Amaryllis flowers by conveying the pollen of one flower to the stigma of another with the aid of a camel-hair pencil. So as not to wet the flowers. Sow balsams.

Phalaenopsis will be in flower. See that the syringe is used with care.

APRIL.

THE Amaryllis will be in flower and should be protected by an awning to retain the beauty of the flowers.

Sow lettuce, knol-kohl, beet, spinach, bhendi, and knol-kohl in dry districts.

Prime, dress, and manure grape vines after a study of the notes given under that head.

Evergreen trees will be making their hot season growth and shedding their old leaves. Collect all the leaves that can be found, and bury them in a pit to make leaf-mould ; there is nothing more essential to success in growing flowers than a supply of this manure. Set a further lot of roses, jasmine, and orange trees to rest.

Where the rainfall is under 50 inches, early in the month sow asters, balsams, prune double jasmines, calliopsis, pinks and phlox drummondi. For early flowering a shady spot with shelter from hot winds is required at this season.

Get in epiphytal orchids from the jungles, cutting away the branch of the tree they are found on rather than injure the plant by pulling it off ; if the branch is too large to cut, be very careful not to break the roots while taking off the plant, as they take a long time to recover when broken.

Cantonment and municipal authorities will be cleaning out roadside drains. Secure as much of the silt as possible ; it is good for lawns and flower beds when mixed with stiff soil.

MAY.

THIS should be a very busy month. If the rainfall is not over 50 inches annually, sow peas, French beans, bhendi, cucumbers, carrots, tomatoes, asters, balsams, coxcombs, mirabilis, and other annuals that are called tender or half hardy in Europe. Annuals called hardy in Europe should not be sown till the end of the rains.

Lay up stores of potting soil, leaf-mould, sand, &c., in sheds for monsoon work. Early in this month get in crinum and musa bulbs from the hills.

Bulbous and tuberous-rooted plants, such as achimenes, gloxineas, caladiums, dahlias, and artichokes will be starting into growth, and should be re-potted or transplanted into fresh ground.

Prune and manure roses, figs, and peaches. Plant gladiolus roots towards the end of the month with a liberal supply of well-rotted manure mixed with the soil and a lot of sand round the bulb. Plant from two to four inches deep in proportion to the size of the bulb. As orchids start into growth, begin to water them more frequently until they get water daily either by hand or from rain by the time the monsoon comes.

Re-pot all bulbous plants as they start into growth.

Sow white and green knol-kohl or kohl rabi.

Open up roots of and manure orange trees heavily.

JUNE.

THE monsoon comes over Western India during the early part of this month, and after the first burst of rain, there is generally some fine weather, which is the seed time *par excellence* throughout the dry districts of the Bombay Presidency and the most favourable seed time for gardens in the parts of the country where the rainfall is not over 50 inches annually. There are very few seeds that may not be sown at this time with advantage. Note a few of the exceptions—candytuft, pansy, antirrhinum, and petunia succeed better two months later. Spinach and the globe artichoke do not like the heat at this season and are better sown later; while all the cabbage tribe, including cauliflower, knol-kohl, Brussels sprouts, broccoli, and turnips are so much subject to attacks of green-fly during the month of July that it is better to defer sowing.

Plant out seedlings that have been raised in shelter.

Sow radish and lettuce fortnightly, and mustard and cress weekly or oftener from this month to November. Sow mango seeds for grafting stocks.

Look out for mildew on roses, and cut off and burn the affected parts.

Read the note on avoiding greenfly and other noxious insects at page 77.

JULY.

IF any of the cabbage tribe was sown last month, they are likely to be infested with green-fly. For this pest, give frequent doses of an infusion of cheap tobacco or salt-water.

Weeding is the grand occupation of this month, and should be done thoroughly. The weeds should not only be cut down, but carried to a pit and buried They make an excellent manure, and should invariably be cut down before the flower appears. "One year seeding, ten years weeding" is not more trite than true.

Pick off the rainy season flowers from vines, as they do not ripen fruit from these flowers and will flower again later.

Plant out balsams, coxcombs, asters, and all kinds of flowering plants that were sown last month.

Plant gladiolus bulbs if any have been kept back so late; they do well when planted at this season in dry districts.

During this month a purple-coloured caterpillar commences its ravages on roses by eating the leaves and flower-buds. Make a careful search morning and evening wherever the slightest sign of its work appears and kill.

Bud orange, lemon, and pumalo stocks.

Crown, graft, or inarch the mango.

AUGUST.

SOW the main crops of cabbage, cauliflower, and celery and Dandelion during this month, and take care to have the white varieties. The purple colour in many varieties is caused by alkali which the plant takes up, and in proportion to it power of assimilating this alkali is its power of resisting cold and its harsh taste; but as we do not require our garden plants to resist much cold, let us have the white varieties.

Give caladiums and other plants that are growing fast and perhaps pot-bound frequent doses of weak liquid manure.

Hoe and weed every dry day. Clip edgings and take the points off the ends of straggling shoots of Noisette Roses.

Bud oranges and pumaloes on citron stock. Take care that your pumalo buds are from a seedless-fruited tree.

Replant edgings of Alternanthera two lines 4 inches apart, make one fine broad line after a short time. The breadth of the edging should be proportionate to the width of the road.

Put in cuttings of crotons and repot all that have filled their pots with roots.

SEPTEMBER.

MARK places where Nymphæa are in bloom in tanks which dry up, so that the roots may be dug up in February and March.

Is an excellent time to transplant roses and other shrubs that on the Deccan will have finished their rainy season growth and on the Concan will just be starting from the rest that excessive rain sends them to.

Sowings may be made of Cauliflower, Cabbage, Turnip, Carrot, Knol-Khol, and flowering annuals, such as Candytuft, Lobelia, Pansy, Antirrhinum, Balsam, Cockscomb, Mignonette, Nasturtium, Petunia, and Phlox Drummondii.

In districts with heavy rainfall this is the general sowing time for nearly all flowering plants, as the heavy rains that would cause tender seedlings to damp off are nearly over. Much cleaning up, pruning and soil stirring should be done during this month. Let your seed-sowing compost have fresh loam, leaf-mould, and sand in equal proportions if possible. If good sand not apt to bind is not procurable, bricks pounded and sifted make an excellent substitute.

Sow Petunia for cold season flowering; the treatment is the same as for Portulaca.

Propagate, Gesnera, Begonia, Achimenes, Gloxineas as directed under these different heads.

Inarch or crown graft Mango trees.

OCTOBER.

GLORIOSA is in bloom in jungles where the rainfall is heavy. Send out a man with a pot of lime-wash to mark the places where the plants are, so that the roots may be dug up during January or February.

In places where the rainfall is not over 50 inches annually, the growth of the season on rose stocks should by this time be getting firm and ready for budding. As soon as the wood is firm enough to bear handling without breaking off short it is ready. Good plump buds are to be got at this time also, and budding may safely be carried on up to February.

Put in cuttings of Cypress trees. Sow tomatoes and annuals for succession.

Maiden-hair ferns will now be making strong growth, see that the supply of water is not stinted.

Re-pot all plants that are pot-bound and required to grow on during the cold season. Gradually reduce the supply of water to orchids from daily during the monsoon to twice a week from January to June.

Water freely pumalo trees that are swelling their fruit.

Plant cuttings of geraniums.

Sow seeds and put in cuttings as directed for last month. Seeds need careful shading when sown during this month as the heat is sometimes excessive and good seed is often lost. Inarch mango trees if neglected last month.

NOVEMBER.

SOW jumbooree seed for orange stocks. Late sowings of cabbage, knol-kohl, and cauliflower may still be made. Propagate *Yucca gloriosa* by cuttings from short hard stems that have grown on poor soil. Despatch indents for seeds and bulbs to Europe.

This is the general season for putting down cuttings in places where the rainfall is under 50 inches annually; but where the rainfall is heavier, the wood will be found to be scarcely ripe enough, and the time for cuttings as a rule should be January.

Cauliflower just coming into flower will be greatly benefited by a liberal supply of weak liquid manure, and celery will be grateful for similar treatment every alternate day.

Sow beet on the spot it is intended to grow on, unless you possess extra skill in transplanting, as if not the root is sure to be disfigured.

To transplant beet properly, soak the seedling bed thoroughly with water and pull up the plants gently, take a dibble and make a hole—a good deal larger than the root requires,—let the root down straight in the centre, insert the dibble about two inches from the side of the hole, and press the plant with the soil to one side. Sow Phlox, Hyoscyamus, and transplant rose trees if the roots prove long and with few fibres trim them off.

Plant out seedlings from late September sowings and mulch the ground with small leaves between the plants. This saves watering and assists growth.

DECEMBER.

SEPTEMBER-SOWN Annuals should be in bloom. If cold winds prevail at night, water in the morning instead of in the evening, as is advisable at other times.

Divide and transplant perennial phlox so that the plants may be strong before the hot weather comes. Enarch and crown graft mangoes.

Look out for a little caterpillar that at this season destroys rose leaves. Cutting off and burning the infected branches is the best cure. Red spider, thrip, and mealy bug also appear on plants that are crowded near to bungalows. A thorough washing with a jet of water repeated daily for a week will kill the pests.

Look after roses that refuse to open their buds, see that the drainage is perfect, and give frequent weak doses of liquid manure.

Epiphytal orchids will by this time have finished their growth, and should get water about once a week only from this time till the rains come on.

Take the points off fruit-bearing vine shoots, and keep about one-half of the young growth cut back so as to let the fruit get the benefit of the sap, and keep the fruit shaded by foliage. Examine budded rose trees and untie buds that were put in some time ago and have grown a few inches.

Sow balsam, clarkia, and larkspur at the beginning of the month.

Sow jumbooree seed for stock if it has been neglected earlier.

MADRAS GARDENING CALENDAR.

BY MR. J. M. HENRY.

A GARDEN CALENDAR demands of the reader the exercise of judgment, for it blindly followed it may prove as often wrong as right. The reader may, however, depend upon the order of sequence of the several details of work as accurate, as having been acted upon for five years by the author while Superintendent of the Agri-Horticultural Society's Gardens at Madras.

Select the best of everything and grow everything well.

Crop the ground systematically as if you expected any day to give an account of your procedure. Change your crops from place to place so as not to grow the same things on the same plots two seasons in succession. Lastly, sow everything in drills at the proper distance apart. When crops are in drills they can be cultivated, and where irrigation is a necessity, so is drilling.

JANUARY.

ASPARAGUS.—Keep clear of weeds by frequent stirring of the soil; irrigate weekly.

Beans, French.—Sow for late crop; keep those in bearing well forked; irrigate every fourth day.

Cabbages.—Plant out the smaller varieties from the seed-beds, and if kept well watered, will keep up a succession of small heads through the hot season; do not root up the stems when first cut, but as each line is cut, fork in a little fresh manure and irrigate.

Brussels Sprouts—May be treated in like manner.

Celery.—The farthest forward should now be fully earthed up, and irrigation given weekly into the trenches between the rows.

Cucumbers.—Keep down over-luxuriant foliage by clearing off lateral shoots: put bricks or house tiles under the fruit.

Lettuce.—Tie up those forward enough; put in another sowing for succession.

Turnips.—Clean away all weeds and irrigate frequently.

Radish—Sow weekly on well prepared beds.

Peas.—Keep clean by frequent forkings; irrigate well weekly; water in driblets is certain to bring on mildew, and your former labour is lost.

Country Vegetables.—Let all ground intended for these be well dug up if not already done, and a good supply of farm-yard manure applied.

JANUARY—*continued.*

Flower Garden.

This should be very gay with many of the European half-hardy annuals.

Asters.—Keep beds well stirred and clean, see to ties in pot asters, and give them occasional waterings with liquid manure; goats' drippings make good liquid manure for asters.

Amaranthus.—Treat as above for asters, put in a fresh sowing for the hot weather.

Balsams.—Look to the shifting of successions in pots, if allowed to get pot-bound, loss of leaves and mildew is your reward. Grow singly in pots, when two or three are in one pot, one always spoils the others

Carnations.—See to ties, examine well all the buds, and see there are no caterpillars eating away the side of the calyx.

Cockscombs.—Keep under a slight shade; do not water overhead.

Convolvulus.—Put up neat bamboo trellis; keep them well exposed to the morning sun.

Coriopsis—Will require little attention further than regular watering; those in beds should be kept well tied and clear of weeds.

Dahlias.—See to staking and tying; keep a watchful eye for white-ants.

Dianthus—Water well every evening; beware of brackish water.

Geranium.—Keep in slight shade, as the sun gets very powerful now.

Lupins.—Water freely and see to ties.

JANUARY—*continued.*

Peas, Sweet.—They do not do well; where grown see to trellises and keep in partial shade; never expose to the afternoon sun.

Petunias—Plant out for the last time; those in pots will now be in flower and will require constant attention in watering; strike cuttings of the double varieties; they will go through the long hot dry season better than older plants.

Phlox, Annual.—These will require constant hoeing and watering, as they will now come into flower; those in pots will require a little liquid manure, goats' drippings, which should be kept in a large tub out of sight and used after it has settled and become clear.

Portulaca.—Keep up successive sowings, as they are extremely pretty and last a long way into the dry season; when all others are gone, the portulaca is often seen flowering luxuriantly on some back neglected walk with nothing but the Madras red gravel, which, by the way, is admirably suited to many of our annuals.

Sunflower.—Sow in drills two feet apart.

Verbena.—Plant in flat pans; keep those coming into flower well watered; watch thrip and red spider; if they appear, sprinkle with flowers of sulphur after watering.

Zinnia.—Water freely with liquid manure as they are coming into flower. Collect seed only of such as are of good colour and well shaped.

Many of the beds in the flower garden will now be filled with foliage plants; this will require good soaking of water two or three times a week, keep them well clipped and neat. The clippings should not be thrown away, but put into nursery beds in partial shade, then the old plants need not be saved of such as *Alternantheras*, *Coleus*, &c.

Agaves.—This had better be left until the beds are undergoing an alteration for the dry season.

Fruit Garden.

Custard Apple.—Watch the fruit; see that rats, birds, &c., are not carrying them away; stop any gross growth that may be showing.

Banana.—Cut off the point of the flower spike as soon as 100 or so of the fruit have set water by irrigation weekly.

Pomegranate.—Gather the fruit as soon as you observe the smallest crack in it.

FEBRUARY.

READ the January Calendar before proceeding with this. See what is undone and spare the necessity of reminders here. If in previous month my advice has been carefully followed, you will now be reaping the benefits of your labours by good vegetables at your board. It has often been remarked that there are no peas like Madras peas for flavour, and truly so: this is no reason why we should continue to grow inferior varieties when many of the English varieties flourish and fruit freely. As ground becomes vacant, have it well manured and dug at once; it is then ready for your country vegetables, which must be sown this month. Keep all English vegetables free from weeds, and keep the fork going. If you have attended to my former instructions and have had everything sown in drills, there will be no difficulty in doing this. Never fork immediately after watering, but, on the contrary, as early before it as possible.

French Beans.—Sow a last crop; if the weather is favourable you may have a good one.

Brinjals.—Plant out in rows one foot and a half between each other and the same in the drills.

Bottle Gourd.—Sow in pans in a mixture of leaf mould and sand; pot off singly as soon as you can handle them.

Cucumber, country.—In like manner.

Melons, Water and Sweet.—Ditto; also *Snake Gourd and Squash.*

Flower Garden.

Keep scrupulously clean and everything in its place; for on this depends the whole success of a flower garden. Attend to former instructions, throw nothing away, but in some back corner put in every clipping as a cutting; by this means you may be able to keep your flower or those of your neighbour much longer into the dry season.

All European half hardy annuals will now be in perfection. Attend to January's Calendar, and do not water overhead such as are in flower.

Fruit Garden

Plantain.—Clear away old stems that have fruited, and secure such as appear too weak to carry their fruit.

Sapodilla Plum.—Will now be beginning to ripen; use every means to keep away squirrels, bats, &c. I have found, as regards the latter, a flag put on a long pole a good thing to frighten them.

MARCH.

ENGLISH vegetables will now be giving place to country ones, many of which are well worthy of attention; indeed, very much more than they get.

Asparagus—Will require weekly waterings towards the end of the month. If they have been properly managed, the seeds will be showing change of colour, then water must be withheld to a great extent, once a month will be sufficient until growing season, which is generally about July or August. Most other English vegetables being annuals, in this climate will require constant watering until used or killed by the sun, then the ground should be immediately manured and dug up a foot or nine inches deep. If practicable it is good practice to trench 2 or 2½ feet deep and throw the soil into ridges.

Bottle Gourd.—This requires very deeply dug soil, indeed the best method to grow this is to dig a large pit, throwing the soil into a large heap. Mix with manure when doing so, and sow or plant on the mound formed.

Cucumber.—This crop should be planted at distances of six feet each way. The best plan is to plant them near a fence, where they can cling; you get a much larger crop from a small piece of ground.

Sweet Melon.—These do equally well when treated as cucumbers, but require a little more attention, especially as the fruit gets large. A piece of common net I have found a very good thing for supporting the fruit; they also require richer ground and more water in the early stage of their growth. To have first class fruit, it is necessary to get your fruit all set together, as they then ripen about the same time when water can be withheld, giving the fruit a fine flavour, which is not the case otherwise.

MARCH—*continued.*

Goa or Double Beans.—Sow in drills two feet apart, in single rows, four inches between each seed.

Snake Gourd and Squash.—Sow in drills two feet apart. Sow singly at the root of a tree or side of a fence; if neither of these be available, sow in the open and erect a trellis. The backyard is a good place for both, and their foliage throws a grateful shade during the hot months.

Sweet Potatoes.—Plant small tubers or small pieces of the stem; the former come very much sooner to maturity. Plant in drills two feet apart and 1½ feet in rows. Keep well watered.

Spinach.—Sow in drills 1½ feet apart—a delicious vegetable.

Tapioca.—Plant stout cuttings of the stem 3 feet apart each way.

Tomatoes.—This is a vegetable, or rather fruit, the seeds of which must be imported yearly, or it degenerates down to the size of a common marble, and that in the first generation. Sow in pans, plant out in rows 4 feet apart and one foot from plant to plant.

Yam.—Plant offshoots in drills 3 feet apart and 2 feet in rows.

Flower Garden

Many of the flowering plants will now be dying away. Collect seeds of all that come to maturity; dry perfectly and put into hermetically sealed tins.

All beds not required to be filled up again have dug up roughly. In a country like this, a little trouble and forethought keeps the flower garden gay all the year round. For the summer months we are dependent on our foliage plants, of

MARCH—*continued.*

which there are a goodly assortment. They can be planted in every conceivable design to suit taste. For a dark ground we have the many varieties of *Alternanthera*, also *Graptophyllum sanguineum*, *Tradescantia zebrina*, *&c.* For light we have *Eupatorium*, *Graptophyllum hortense*, and *Graptophyllum hortense variegata*, the many varieties of Crotons. Both this and the former require to be used in their young state and kept pruned back. Remembering former directions, put every slip into the nursery, and when the time comes to lift the parent plant, it can go into the shrubbery. Many other plants will suggest themselves to the intelligent reader. All those that will stand cutting or that grow very slowly, such as the Agave family and its allies, will prove useful.

Fruit Garden.

Figs.—These will now be going to rest. Encourage them doing so by keeping back their water. When thoroughly at rest, open out the roots, cut back over-luxuriant ones ; leave open for a fortnight or ten days, during which time get your composite ready, consisting of all the rotten vegetable matter you can secure, with a goodly mixture of manure.

Mangoes—Will now require occasional looking to ; beware of bats.

Sapodillas—Will still be in perfection if carefully watched.

APRIL.

Kitchen Garden.

EXAMINE carefully last month's calendar and see if everything is carried out, if anything has been forgotten get it in at once, for the ground will be now getting very hard. Cucumbers and Goa beans, if to be grown on trellises, will require these now. Keep the soil worked on every available occasion, watch when the ground is sufficiently moist, so that you may fork it up, leaving it as rough as possible.

Water and Sweet Melons.—Likewise, giving good soaking of water every other day, until you get your fruit all set.

Gourd.—Of all descriptions require abundance of water. Those at the roots of trees will require very little other attention unless to assist the young plant to get a firm hold of the branches, when it may be left to itself.

Tomatoes.—I have found a strong post every two yards, with a spar top and bottom filled in with crossed bamboos, a good trellis for this vegetable. It is necessary to direct the stems and keep them from getting intermixed, by doing this, you are enabled to check over-luxuriant and gross growth.

Vegetable Marrow.—This is one of the most delicious vegetables throughout the hot weather of Madras, and is certainly well named. To have them in perfection, pits four feet wide each way and two feet deep should be dug, the soil mixed with its own quantity of manure and returned to the pit, which will then be a heap. Place your plants from the pot carefully in this heap, it is better to place two in every such heap. These heaps should be 12 feet apart, to give the plan room to spread.

APRIL—*continued.*

Spinach.—To have it in perfection it will be necessary to put in fortnightly sowings of this vegetable; as it seeds freely, the old sowings may be allowed to run to seed, which should be collected and re-sown.

Flower Garden.

This should look neat and clean now if March directions have been followed and the work got forward; if not done, push ahead all planting, cleaning up as you go on. Nothing looks worse than a slovenly flower garden. If you have pure water sprinkle the plants all overhead night and morning. Any kind of a pump that you can make to imitate rain will do much better than the watering pot. The finer it falls the better for your plants. Water grass also if your beds are cut out on grass; if on gravel walks, slightly water them in the evening. It will make everything pleasant and cool, and on a fine moonlight night nothing can be more pleasant than a walk in a well kept flower garden.

Fruit Garden.

Plantains.—Make successive plantations, by digging trenches 2 feet wide and 2 feet deep, the length of your ground; then half fill with manure, dig the trench another foot deep, and mix the manure well with this soil. They will require no water until signs of growth appear, then they may have slight irrigation.

Pine-Apple—These will now be ripening their fruit, but they do not thrive in Madras.

Grape Vine—Will now be going to rest, encourage it to do so gradually by slight waterings.

MAY.

Kitchen Garden.

WATERING and erecting trellises will be the chief work of this month in this department. Watch melons carefully. The earliest crop should be showing signs of ripening.

Tomatoes.—Tie in and check over-luxuriance. The earliest should be fruiting freely.

Flower Garden.

Eupatorium and Alternanthera of sorts will require the shears. Keep the grass short by frequent cuttings and green by daily waterings.

Fruit Garden.

Custard Apples, Pomegranates, Guavas, and Figs will now be at rest. Prune out all branches that cross each other; clear away gross feeders, cut out old wood from fig trees; open out the roots of the latter; cut back very strong ones; in fact, keep the roots as much under your eye as the branches. Have a good compost of rotten leaves and turf ready to fill in, in the course of ten days or a fortnight.

JUNE.

Kitchen Garden.

WE may now expect occasional showers, but be not tempted to sow English vegetables.

Keep a watchful eye over your country vegetables; they will run to halm instead of fruit.

Water brinjals freely; put in a last succession, that is, if you do not grow them all the year round.

Keep up a succession of spinach.

Flower Garden.

Orchids will require occasional watering. Gloxinias, caladiums, achimenes, indeed all tuberous-rooted plants, will now begin to show vitality. Put off encouraging it as long as possible, but do not check it, as it weakens the plants.

Towards the end of the month re-pot ferns, indeed all green-house plants. Keep a moist atmosphere by shading with mats, &c., and by sprinkling the ground with water. A good plan is to lay about an inch of good river sand on the floor of the house or under the tree wherever your plants are that have been re-potted, and keep it moist by frequent watering.

Attend to last month's instructions as to cleanliness in the outside garden.

Fruit Garden.

Mangoes—Will now be fit to gather; collect and store in straw for a week or ten days.

Plantain.—The old plantation fruiting will require water twice a week; new plantations once a week.

JULY.

Kitchen Garden.

PLAN off your garden for English vegetables. This will assist you in laying down manure near the spot where it will be required. As soon as the ground is empty of country vegetables, have it well dug as roughly as possible, having the manure put in at the same time.

Lettuce.—Sow a small bed; shade until up.

Mustard and *Cress* may henceforth be sown weekly in partial shade for the next three months.

Flower Garden.

Continue re-potting. Attend to last month's instructions as regards moisture, unless an exceptional month for rain occurs.

Transplant ornamental shrubs. Plant out young trees, &c., &c., and water every evening. They will be established before the heavy monsoon affects them, and will do much better than if planted later in the season.

See to all creepers that have been at rest; prune and tie afresh; but before doing so examine trellises, as white-ants are very destructive. Teakwood well tarred is the best wood for such work; if built in with brick and chunam, it will last for many years.

Fruit Garden.

Grape Vine.—Have the roots well opened out. Treat as for figs, only let the compost be very much richer. Broken bones, horse hair, cleanings from the shambles, old boots, pieces of leather, everything with animal matter in it well incorporated with the rotten leaves and turf.

Sapodilla Plum.—This is the season for inarching. Get your young plants placed on a stage convenient to the lowest branches, have the branches securely tied to the stage or to a strong stake to prevent shaking by wind or other causes. If young plants are not available, the wild Sapota tree (*Bassial longifolia*) will do equally well.

AUGUST.

Kitchen Garden.

ASPARAGUS must be seen to now. Take off the covering of manure and have it well dug in between the beds, putting about an inch or an inch and a half of good friable loam on the top of the bed. Prepare new beds by having an adjoining piece of ground well manured and formed into 2 feet raised beds with 18 inches between each. Sow two rows of seed six inches from the path, consequently leaving a foot between the rows. Here, in Madras, you will be able to cut from seed sown at this time next January or February.

Artichokes, Jerusalem,—May now be planted 2 feet between the rows and 18 inches from tuber to tuber. Water slightly until above ground.

Flower Garden.

Achimenes, Caladiums, Gloxinias, and such like, that have been neglected last month, see to at once.

Orchids.—Water morning and evening.

Ferns—Likewise; keep the place they are in moist by attending to last month's instructions, also all newly shifted pot-plants. Finish transplanting all shrubs, also the planting out of young trees. Turf neatly any places where shrubs have been moved from; keep your beds and grass neat and scrupulously clean.

Fruit Garden.

Grapes.—Fill in all soil round the roots, if not already done. Those in pots may now be brought on without fear of check.

AUGUST—*continued.*

Mangoes.—Inarch.—See instructions in last month for Sapodilla plums.

Plantains.—Water freely.

Guavas, Custard Apple tribe, and *Pomegranate* will require occasionl looking to, to stop strong shoots, or give a little water should the weather prove dry and hot.

SEPTEMBER.

Kitchen Garden.

IT will now be necessary to try all your English seeds. A very good plan is to have an upright post with another nailed on the top and a piece of canvas stretched across with a light reafer at each end and secured to two smaller posts near the ground being equally distant. The cloth can be partially rolled on the reafer and tied to the larger posts at night, allowing the seed pans to have the benefit of the dew, and stretched out in the morning to protect the seeds from the sun's scorching heat. The same erection will be very convenient for all half hard European annuals, which will require sowing about the end of the month. Get every vacant spot prepared for the reception of its particular seed, which was planted last month.

Brussels Sprouts, Cabbages, Savoys.—Sow a small bed of each towards the end of the month; shade until well up.

Peas.—Put in a small sowing; sow in rows 3 or 4 feet apart.

Spinach.—Likewise. Sow in rows 18 inches apart.

Herbs.—Divide all such that require it. Sow a few in pans under the canvas.

Flower Garden.

Get your composts ready, for next month will be a busy one in this department. Note down your design for filling your beds towards the end of the month. Begin clearing beds of their hot-weather stock. Note those plants that you think have impoverished the ground and give a little extra manure.

Fruit Garden.

Attend to tying and pinching. Examine your inarching stage; see that all is secure previous to a heavy downpour.

Pine-Apple.—Plant suckers and crowns three feet between the rows and two feet from plant to plant.

OCTOBER.

Kitchen Garden.

ASPARAGUS.—Water frequently. Give a slight dressing with coarse salt.

Cabbage.—Plant out from last month's sowing. Sow another bed.

Brussels Sprouts and Savoys.—Likewise.

French Beans.—Sow in drills 18 inches apart.

Carrots.—Sow first sowing on a four-feet bed, six inches between the rows on the bed. Shade and water with the watering pot.

Parsley.—Sow a small patch, shade and water. The first sowing of this should be raised in pans and transplanted.

Parsnip.—Sow in rows 18 inches apart.

Peas.—Sow in drills two together and 3 to 4 feet between the double drills.

Spinach.—Sow in drills 1 foot apart.

Turnips.—Sow in drills 18 inches apart, and thin out the plants to 9 inches.

Flower Garden.

Let your compost heap consist of two parts good friable loam, quarter rotten leaves, and quarter good river sand. Put it through a sieve ; pots, pans, and a shallow box are all that are now required. Observe that everything is scrupulously clean. Cover the bottoms with pieces of broken pots ; if you have not sufficient, bricks broken to the size of pigeons'

OCTOBER—*continued.*

eggs will do equally well; cover this with your siftings and then put on your fine soil. A good plan is to cover the seeds to their own depth with soil. Some of your heap sifted a little finer with another quarter of white sand added makes a good covering.

All annuals known as half hardy in Europe will succeed now. The quantity to be regulated by the size of your garden. Consult your plan and have a few to spare. Prick out into a shady place as soon as you can handle the seedlings.

Fruit Garden.

Grape Vine.—Regulate, pinch back over-luxuriant shoots, remove very weakly ones, and tie every one in their proper place. See that they get plenty of water, but on no account allow stagnant water to be at the roots.

Figs.—In like manner.

Custard Apple tribe, Pomegranate, and *Guavas* will require looking at occasionally to check over luxuriance, and regulate the shoots by thinning out where too thick and encouraging where thin and weakly.

NOVEMBER.

Kitchen Garden.

THE first heavy burst of the monsoon will have passed over now. Get in yoor main crop of English vegetables.

Peas.—Sow a good breadth of the different varieties. Veitch's perfection and Sutton's Emerald gem both do well in Madras and are of excellent flavour. A good plan to follow in sowing peas is to keep between the rows the same distance as the height of the peas. Sow Spinach between the rows; if not required it may be dug in; it makes excellent manure.

French Beans.—Sow a succession. They do well in Madras in the cold weather.

Cabbages.—Plant out in drills 2 feet apart, 18 inches between the plants. The smaller varieties may be reduced six inches each way. Brussels sprouts and savoys in like manner.

Beet.—Sow in drills 18 inches apart and thin out to one foot.

Parsnips.—Sow in drills 2 feet apart and thin out to 18 inches.

Flower Garden.

If former instructions have been followed and everything has succeeded, you will only now have to plant your several beds. Should any one thing have failed, try and substitute something of the same colour so as not to alter your design.

Caladiums.—Re-pot as the smaller pots get filled with roots. Water on alternate days with liquid manure.

Crotons, *Dracænas*, *Dieffenbachas*, *Anthuriums*, and all foliage plants, encourage a free growth, and on no account allow them to have a check.

Fruit Garden.

Attend to last month's instructions as regards grapes, figs, &c.

Plantain.—Secure heavy bunches by removing all decaying matter.

DECEMBER.

Kitchen Garden.

ASPARAGUS.—Be careful in cutting not to injure the crown.

Beans.—Sow succession.

Cabbages.—Plant out Sugarloaf and such finer varieties.

Lettuce and Endive.—Sow in succession. Tie up those that come to maturity.

Beet-root.—Clean and irrigate frequently.

Turnips.—Sow a last succession.

Radishes.—Continue sowing weekly.

Parsnips.—Clean, thin, and irrigate frequently.

Peas.—Stake; attend to irrigation.

Flower Garden.

Examine your beds daily; make good failures; see that they are thoroughly watered and not sprinkled only.

Attend to all annuals in pots, a list of which you will find in the January Calendar. Everything in this department will be alive now, and it behoveth the Indian gardener to keep his eyes open, as over-watering or bad drainage may kill the most expensive of your pets.

Roses—Should now have their final shift. They do not stand pruning well in Madras; it is therefore necessary to pinch the growing shoots to retain them in form. It is almost hopeless work propagating the finer varieties in Madras. It is much better to get them down from Bangalore.

DECEMBER—*continued.*

The common Edward Rose grows freely in the ground, and with irrigation and plenty of manure you may have roses all the year round.

Fruit Garden.

Grapes and Figs.—Continue tying and pinching. Remove the bunches of flowers from the former if there is an appearance of too heavy a crop.

Sapodilla Plums.—Inarched in July should now have part of the parent branch cut out to allow the new scion to depend more upon its new parent.

Mangoes.—Do likewise, but slowly and little by little; if the plant seems to suffer from the first operation, defer another until it has recovered.

GARDEN CALENDAR FOR THE PROVINCE OF MYSORE.

By J. CAMERON, Esq., F.L.S., Superintendent, Government Gardens and Museum, Bangalore.

SEASONS (approximately).

Warm.	*Rainy.*	*Cold.*
March.	June.	November.
April.	July.	December.
May.	August.	January.
	September.	February.
	October.	

JANUARY.

Weather.—Often foggy in the early morning. Bright and warm during the day, but delightfully cool before and after sunset. Mean temp., 70°. Average rainfall, 0·26.

Kitchen Garden.—This is well stocked now with crops of Europe vegetables, the maxim being that, cold-country subjects are brought to perfection at the least trouble and expense during our coldest season. Growing crops of the cabbage tribe should be abundantly watered, and caterpillars will have to be destroyed by hand-picking in the early morning. Peas, beans, spinach, radish, and such vegetables as mature quickly may be sown periodically until the end of next month. Reap potatoes.

Fruit Garden.—The strawberry crop requires much attention now to obtain the best results. To expose young fruit to the light, some people clip off the leaves, but this is a

JANUARY—*contd.*

bad practice, unless a judicious selection is made of such leaves as are themselves concealed from the effects of light. Water abundantly, and give occasional mild doses of liquid manure. Vines should be watered sparingly as the grapes begin to colour. Apples, pine-apples, raspberries, and peaches are in season, and as the fruit ripens irrigation should be moderated.

Flower Garden.—Annuals that were sown in October will now be in full perfection, the fittest subjects being the fine varieties of aster, phlox, antirrhinum, poppy, lobelia, stocks, nasturtiums and pinks, &c. Sow petunias, verbenas, pinks, and portulacca to obtain satisfactory result in March and April.

Roses require plenty of water and shelter from high winds. The flower buds should be partly removed (when they are very young) when the object is to obtain a definite number of very fine blooms. To retain blossom, keep the plants cool and shaded. Insert Fuchsia cuttings in silver sand under bell-glasses.

FEBRUARY.

Weather.—The temperature rises perceptibly towards the end of the month. Crops are almost solely dependent on irrigation from tanks and wells. When the morning fogs continue, they are said to be injurious to some of the fruit blossoms of the season, especially to the mango. Mean temp., 74°. Average rainfall, 0·17.

Kitchen Garden.—As vegetable land becomes vacant for rest during the dry season, it should be thoroughly cleaned and dug up. If insects had been prevalent it is advisable to kindle fires over the land, consuming such material as would conceal eggs or larva. Defer cropping Europe vegetables until the rains set in, in June. Little beds of salad plants, such as lettuce, cress, radish, and mustard, will flourish near the irrigation channels where the soil is cool and moist.

Fruit Garden.—Sow melon seed in richly manured soil. Figs, pomegranates, and strawberries are added to the fruit supply. The latter should be mulched lightly with clean grass to elevate the fruit and keep it clean. Grapes are also ripening, and if some protection is not given the bunches will be infested by ants and bees. Fine muslin bags keep off the latter.

Flower Garden.—Plants in the open require much water, but care should to taken not to wet the flowers too much. Indian gardeners dislike to stoop, and to avoid this, they often discharge a waterfall upon the choicest and most delicate flowers. Transplant seedling verbenas, portulaccas, and such flowering plants as relish dry weather. The cultivation of double petunias (of which there is now a very fine strain) in pots is now attended with the best results. As roses go out of bloom the young fruit should be nipped off.

MARCH.

Weather.—It is now decidedly hot with a stiff breeze from the N. E. Many deciduous plants cast their leaves, and gardens as a rule are untidy. Mean temp., 80°. Average rainfall, 0·29.

Kitchen Garden.—Additional skill and labour are now required to maintain the utility and beauty of gardens. Nature's intention of resting the soil should be adopted when labour and material are insufficiently available. Late crops of root vegetables should be wholly removed from the garden. Carrots, beet-root, and parsnips can be preserved for a short time in cool cellars. The best plan is to hang them up in bunches with their own leaves about them. Globe artichokes are in season. Prepare beds for asparagus. They should be deeply worked, rich, friable, and rather sandy. Collect manure to be ready for application when the land is moist.

Fruit Garden.—Plant melon seedlings (when they obtain their first rough leaves) on prepared beds of old manure; the latter being top-dressed to the depth of one foot with a friable compost of loam and vegetable matter. Strawberries will be infested by slugs and birds, and they must be handpicked in the one case and covered by a net in the other. Prune apple and peach trees. Some plants may require root-pruning to moderate the vigour of wood growth. The popular practice is to uncover the roots (partially) for some days prior to the time of pruning. Root-pruning and transplanting are operations of more value in producing uniform fertility.

Flower Garden.—Protect delicate plants from the withering effects of the prevailing wind. Tuberous and bulbous plants that have been dormant for some month can be forced on gentle hot-beds, but they should first be repotted in good

MARCH—*continued.*

soil. The following genera will naturally begin to vegetat
about the end of the month, *i.e.*, Gladiolus, Gloxinia, Dahli
Achimenes, Caladium, and Tuberose. Repot Crotons, Dra
cænas, and other fine foliage plants. Orchids in bloom shoul
be sparingly watered. Ferns require rather more shade tha
usual and plenty of water. Fallen leaves should be careful
collected to form leaf-soil.

APRIL.

Weather.—This is usually the most disagreeable month of the year. Dust storms are prevalent during the day and the nights are still and sultry. The occasional thunderstorms are sometimes accompanied by refreshing showers of rain. Numerous trees are in blossom, and their falling flowers strew the ground in great profusion. Mean temp., 80½°. Average rainfall, 1·40.

Kitchen Garden.—Divide and replant asparagus roots in the beds that were prepared last month. Seeds should not be sown till the rains begin. Look over potato tubers and put aside the best for "sets." After showers, the vegetable plots should be dug over several times to admit the fertilising elements of air and water. In reference to this, it should be thoroughly understood that the quality of crops depend much on the mechanical treatment of a soil.

Fruit Garden.—Rose-apples are in season. Prune vines and fork over the soil about them. Manure and dig strawberry plots to induce the plants to form runners for propagation. Apples, peaches, and plums require plenty of water. Fertilize melon flowers. Water-melons succeed the best in a cool sandy soil.

Flower Garden.—Numerous exotics begin to vegetate, and every facility should be offered to encourage vigorous growth. In transplanting or repotting, as the case may be, opportunity will be offered for the propagation (by divisions) of many plants on a large scale. The operation is effected simply by the separation of bulbs, tubers, rhizomes, and suckers. After being repotted, plants require shelter, and usually plenty of water. Gloxinias require careful notice in

APRIL—*continued.*

the verandah or in a small hot-house. Their leaves should not be saturated with water, and the drainage should be good. Insert cuttings of the following plants in some cool shady nook :—Coleus, Iresine, Pentas, Salvia, Acalypha, Centaurea, Chrysanthemum, Eranthemum, Clerodendron, &c.

MAY.

Weather.—The mango and thunder showers create a muggy heat, which is sometimes very oppressive, and the fœtid odour of many flowers (such as the mango and hippe) help to intensify this oppression. But dormant vegetation re-awakens, and the gardener's hands are now full. Mean temp., 82½°. Average rainfall, 3·00.

Kitchen Garden.—Sow vegetable marrow, cucumber, white Georgian maize, peas, beans, parsley, and salads, such as lettuce and cress. Sow celery in seed-boxes, and prepare trenches for the reception of seedlings after rain. In preparing land for root crops work it deeply, applying the bulk of manure to the under-stratum. A rich light soil (easily penetrated) is the best for succulent roots. Water asparagus freely.

Fruit Garden.—The mango and litchi are ripe. See that apple bushes are not suffering from the attacks of "mealy bug." The latter should be washed off with a solution of lime and tobacco. Ripening melons require plenty of light, and the fruit should rest on dry grass. Divide plantain suckers for the extension or renewal of plantations. Prune fig trees.

Flower Garden.—Untidy lawns are ploughed, weeded, and manured after heavy rains. Prune hard-wooded flowering shrubs, and fork up the soil about them. Furnish flower-beds with such hardy plants as will survive the S.-W. monsoon. Zinnias, Tagetes, Marigold, Nasturtiums, Sunflower, Brachycome, Pinks, Heliotrope, and monthly flowering roses are suitable. For later use, sow annuals, &c., in great variety. The following kinds should only be sown in the garden—as many of them are not improved by transplanting

MAY—*continued.*

and some will not survive the operation:—Mignonet Collinsia, Godetias, Clarkia, Poppy, Silene, Leschenaulti Linum, and Nemophila. Prune roses and propagate fro the cuttings which are thus obtained. Tuberous and bulbo plants that are now growing vigorously require plenty nourishment and poltroon.

JUNE.

Weather.—The south-west monsoon bursts about the beginning of the month, and high winds prevail whether it rains or not. As the fall of rain increases, the days become cloudy and pleasant. Mean temp., 76°. Average rainfall, 5·00.

Kitchen Garden.—Myriads of insects appear with the returning verdure of the fields, and their depredations among garden seedlings is most disheartening. They have a special appetite for tender cabbages, turnips, or radish, and without sedulous care it is hopeless to attempt the cultivation of such crops at present.

Plant Jerusalem artichokes and potatoes in well drained land. Transplant celery into trenches. Sow seeds of maize (improved table), vegetable marrow, cucumber, tomato, brinjal, drumhead cabbage, peas, beans, scarlet runners, onions. leeks, and parsley, and keep up a succession of these by periodical sowings for the following eight months. Asparagus is in season; crop sweet potatoes from cuttings.

Fruit Garden.—The mango, pine-apple, and jack fruit are in season. Seedling plants of the former should be planted in position for inarching. Propagate the pine-apple from crowns and suckers. Prune away old wood from plum, apricot, peach, and nectarine trees. Commence the operations of grafting, inarching, and budding. Stop strawberry runners when they have formed three-rooted nodes. Sow seed of the hill gooseberry. After rain all kinds of fruit trees can be planted out.

Flower Garden.—Dahlia, chrysanthemum, gladiolus, and similar tall perennials require to be securely staked and otherwise protected from high winds. Many plants, such as

JUNE—*continued.*

geranium, carnation, picotee, and double petunia are injured by exposure to the heavy rain of this season. Gloxinias and tuberous-rooted begonias require special attention in the verandah or hot-house. Many plants are at this season easily propagated by various modes of division.

Apply liquid manure to roses; disbud and regulate the shoots while they are young. Kill cockchafers at night, or entrap them in an illuminated and tarred barrel. Fill the passages of boring insects with offensive oils or coal tar. Give orchids more water as they pass out of bloom. Re-pot ferns. Sow seeds of shrubs and trees.

JULY.

Weather.—The rains are usually heavy at the end of the month, and there is much wind from the south-west. The nights are cool and pleasant. Mean temp., 76°. Average rainfall, 4·00.

Kitchen Garden.—If necessary, repeat the sowings as commenced last month, but adding parsnip, beetroot, and carrot for first small crops. Plant onions and earth up celery; some persons prefer using tiles for the latter. Caterpillars and beetles are still very troublesome, but lime-dusting and hand-picking will reduce their number greatly. A few narcotic plants grown among the seedlings will also help to destroy insects. The best kind to use are hemp and tobacco. The only cabbage that resists the repeated attack of insects is the coarse drumhead Propagate the following herbs from seed and by the division of old plants:—Rue, lavender, sage, rosemary, wormwood, dill, fennel, marjoram, thyme, sweet basil, and peppermint. Plant ginger.

Fruit Garden.—Bud the orange upon citron and lime stocks, choosing the former for hardiness and the latter for improved flavour. Pinch off vine blossoms to prevent the fruit from setting at this unfavourable season. The flowers will appear again after the rains. Inarch the mango, guava, peach, plum, and graft the apple, pear, and vine-trees. The fruit garden should be dug over frequently to keep down weeds and insects. Apples and peaches are in season.

Flower Garden.—Pot off rooted cuttings of rose, fuchsia, carnation, and similar perennial subjects. The flower-beds should be re-stocked with seedling plants (transplanted) of

JULY—*continued.*

aster, phlox, candytuft, balsam, zinnia, pyrethrum, lupin, cockscomb, larkspur, nasturtium, pinks, and brachycome or "Swan River Daisy." There is usually a break in the weather between the monsoons (August and September), and many of the foregoing will be in full bloom then. Re-pot begonias to have them in flower in October. Roses are in full blossom, give them partial shade and shelter. A large assortment of the best roses should be budded upon the Edward stock. Propagation in every form is now easily effected, and at less trouble and expense than at other seasons.

AUGUST.

Weather.—When the south-west monsoon abates the weather becomes milder. Many people consider this to be the pleasantest time in the year. Weeds and all plants vegetate with wonderful rapidity. Mean temperature, 74°. Average rainfall, 6·02.

Kitchen Garden.—As soon as the monsoon subsides sow root crops, and as the following kinds are not usually transplanted sow for good in their respective sites: Turnip, radish, carrot, parsnip, and beetroot. In dealing with this class of vegetables, remember what has been advised in regard to soil and deep cultivation. Sow seed of Lucknow cauliflour, and plant out drumhead cabbage. Many kinds of country vegetables are easily raised now, and coriander, greens, and radish are in perfection. English peas thrive luxuriantly, and some of the finest crops are now produced.

Fruit Garden.—This is the proper time to form new strawberry beds. Select the strongest runner plants from old beds, and plant in drills, or squares, at fifteen inches apart. The soil must be good and freely manured. Remove pineapple suckers, and stimulate leaf growth by the liberal use of manure and water. When the raspberry produces many weedy shoots simultaneously with the flowers and fruit, the former should be held in check by timely pinching. The following fruits are in season:—Orange, pumelo, loquat, carambola, and apple. Propagate as was recommended last month.

Flower Garden.—As achimenes, gladioli, and other deciduous plants subside in growth, they should be very gradually "dryed off." Cut back the straggling ends of Noisette Roses

AUGUST—*continued*.

and continue the operations of budding as before. The fundamental work of raising show-plants for the following year will now begin, by potting off rooted slips of geranium, carnation, chrysanthemum, fuchsia, gardenia, heliotrope, begonia, phlox (perennial), and similar subjects. Under the same treatment (with one or two shifts into larger pots) salvia, petunia, fuchsia, and geranium will give excellent results at the close of the current year. Sow seeds of giant mignonette for pot-culture. The drainage holes of flower pots will require notice to prevent slugs and warms from retarding their proper function. Dahlias are in perfection. Many shrubs require pruning to keep them within moderate dimensions. The growth in every department of the garden is usually very rank.

SEPTEMBER.

Weather.—This is a warmer month than the preceding, and the afternoon showers are often accompanied by thunder and lightning. The prevailing south-west breeze is refreshing. Mean temperature, 75°. Average rainfall, 6·30.

Kitchen Garden.—As seedlings arrive at the proper size they should be extensively planted out in dull days. All kinds of Europe vegetables will now succeed, and sowings can be made in proportion to the requirements of the kitchen; but for main crops sow in the beginning of October. Plant cauliflower, knol-kohl, tomato, lettuce, endive, Nepaul chilly, custard-marrow, Brussels sprouts, and cabbage. Earth up larger plants of the cabbage tribe, and give occasional mild doses of liquid manure. Pulse crops require a good deal of lime in the soil, and be careful not to repeat them successively in the same plot of ground. The absence of lime will be indicated by the prevalence of beetle grub in the soil.

Fruit Garden.—Examine buds and grafts, removing the clay and other materials where perfect union has been effected. This is a good time to transplant unproductive fruit trees. Fig trees (and many others) become unprofitable when their roots increase largely, and although pruning is not recommended for the latter, the whole plant might be advantageously shifted now and again. Root confinement can be attained by cultivating in tubs or large pots. Strawberry-beds may still be formed, Guava, alligator pear, and hill gooseberry are in season.

Flower Garden.—From seedling plants now potted off begin to cultivate violets, pansy, stocks, cinerarias, and cyclamen. The beetle grub disappears with the late rains, and then valuable perennials, &c., may be bedded out, if necessary.

SEPTEMBER—*continued.*

Begin to winter deciduous plants (bulbs and tubers) as their leaves fall. As annuals pass out of flower the decaying herbage should be consigned to the manure pit, or, if insects are prevalent, burn it where it stands. This is a good time to pot young plants of geranium for culture through the cold season. The fuchsia and other plants that were started in August will require a shift now.

OCTOBER.

Weather.—We are now in the middle of the N. E. monsoon, and the rains are usually very heavy. The wind has changed to the N.E., from whence it blows stiffly. The weather is comparatively cool. Mean temp., 75.° Average rainfall, 6·00.

Kitchen Garden.—Now is the time *par excellence* to crop the garden with Europe vegetables. Noxious insects disappear towards the end of the month; and with nothing to impede them, seedlings spring up in great luxuriance. The native gardener crops extensively with coriander, onian, mehtya (Fenugreek), maize, and various country greens; also with brinjal, bendikayi, and hirekayi. The apparatus for lifting and conveying water should be put in good repair, so as to have irrigation fully at command when the rains subside next month. Plant potatoes and sow main crops of other root vegetables, such as carrot, parsnip, beet-root, and turnip. Tomatoes and vegetable marrows are abundant.

Fruit Garden.—Manure and water vines copiously, and thin out weak straggling shoots which impede the light from healthier parts. Winter apple-trees by defoliation and root exposure (the local practice), or by the less barbarous methods of "drying of," root-pruning, and transplanting. Plants that have already been operated upon should be freely manured and watered. Guavas, custard apples, and bread fruit are in season.

Flower Garden.—Bedding foliage plants are now in full beauty. The most useful of these are the best varieties of coleus, iresine, begonia (under partial shade), farfugium, strobilanthus, and golden feather. The latter forms pretty edgings and masses near the margin of a bed. Pots con-

OCTOBER—*continued.*

taining ripe tubers, &c., may be staked on their sides, or, if rats are prevalent it is better to remove the tubers to sand-beds in the store room. Prune roses at the end of the month to obtain Christmas flowers. Gardenias are now in blossom. Sow flower seeds to obtain results in January. The proper kinds will be seen on consulting the work for that month. Balsam, candytuft, and silene are in flower in 5 to 6 weeks from the date of sowing. Propagate orchids by division and give plenty of water.

NOVEMBER.

Weather.—The heavy rains subside about the second week, and as the temperature falls the mornings become foggy. We are now in the autumn of India, and the falling leaves become a source of untidiness. The nights are delightfully cool. Mean temperature, 74°. Average rainfall, 1·65.

Kitchen Garden.—Many seedling vegetables will require to be planted out, and others more advanced will require earthing up and so on. Divide and replant water-cresses along the margin of water-channels. Tie up tomato plants to expose the fruit to light, and when the latter are too numerous, nip off the small ones. See that growing crops are well moistened at the root, remembering that one thorough watering is of infinitely more value than six surface wettings. Frequent hoeing and stirring is needed to admit fresh air, and facilitate the passage of water. Plant potatoes again; also onion bulbs.

Fruit Garden.—Regulate the young bunches of grapes (not allowing too many to be formed on one branch), and pinch back the adjoining shoots to prevent the miscarriage of nutrient sap. To obtain large berries the bunches should be carefully thinned. Prune raspberry bushes. Water all fruiting plants freely, except when the fruit is nearly ripe. Remove suckers from the base of pine-apples, and stimulate growth by the liberal application of manure.

Flower Garden.—Sow seeds of the following delicate flowers where they are intended to mature:—Acroclinum, godetia, clarkia, linaria, nemophila, mignonette, poppy, silene, centaurea (improved strain). Propagate petunias and carnations from layers and pipings. Sow seeds of *Lobelia erinus* and

NOVEMBER—*continued.*

divide old plants of *L. cardinalis.* Geraniums can now be bedded out. Insert cuttings of many hard-wooded plants, such as fuchsia, clerodendron, graptophyllum, oleander, hibiscus, and others. Shrubberries and copses will require a good deal of pruning.

DECEMBER.

Weather.—This is the coldest month in the year, the thermometer falling, in exceptional nights, to 52° Fahr.; clear sunny days, chilly nights, and foggy mornings denote the prevailing weather of this season. Mean temp., 69°. Average rainfall, 0·49.

Kitchen Garden.—Cauliflower, Brussels sprouts, and broccoli are very plentiful. Root-crops should have the soil thoroughly stirred about them, and the final sowings must now be made of these. Earth up potatoes, and keep the soil open and porous. The garden being fully cropped, the cultivator's attention is mainly confined to the details of irrigation and surface tillage.

Fruit Garden.—Stop vine shoots or remove the weak ones altogether. Grapes become insipid and often split if too much water is given while they are swelling to the normal size. The bunches should be slightly shaded from direct sun. Pine-apples receive less water as they mature. Sow melon seed. Apples, peaches, and rose-apples are coming into season. Give occasional doses of weak liquid manure to strawberries.

Flower Garden.—Complete the pruning of roses at the beginning of the month and attend to disbudding in those farther advanced: seven or eight weeks intervene between the time of pruning and the date of flowering. Trees and shrubs that flower in the hot weather can be safely transplanted, provided they are kept sufficiently moist at the root afterwards Tender flowers are often spoiled at this season through wate being carelessly dashed over them. Sow, to have effect in the beginning of the hot weather, antirrhinum, petunia, verbena, pinks, and portulacca. Propagate English perennials.

J. CAMERON.

CALENDAR OF GARDEN OPERATIONS FOR GUZERAT.

By Mr. J. M. HENRY, Supt., Public Park, Baroda.

JANUARY.

THIS month is in the middle of the growing season for Guzerat, and soil-stirring, watering, and weeding need steady attention.

Earth up celery to blanch.

Tapioca roots should be dug up and the starch prepared: first wash thoroughly, then pound the roots in a mortar, mix the pulp with clean water, strain through a cloth; let the starch subside, pour off the water; if the starch is clean, dry partially by exposure to the sun, when nearly dry sprinkle the starch on a hot iron plate to cause it to run into small knots. The stem should be cut into pieces two feet long and planted six feet apart each way quincunx.

Arrowroot may be prepared by the same process, without the roasting, and small tubers planted in a nursery to keep till the end of April.

Roses should get a liberal dressing of fresh soil from the compost heap, mixed with well rotted manure.

Inarch mango trees.

JANUARY—*continued.*

Water those setting fruit.

Vines.—The roots should be fully exposed for about a month. When all the leaves have fallen off, prune. When there is no fear of bleeding, that is, after the cut surface has dried up, fill in round the plants with a well mixed and pulverised soil one-fourth old rotten bullock manure, one-fourth broken bricks, and the remainder of good garden soil, after which water freely by foolding. Prune guavas and figs, and let them go fully to rest by withholding all water. Knol-kohl, cauliflower, cabbage—indeed all English vegetables—should be in full season. Attend to clearing away all old side leaves, more especially from cabbage that have been cut: they very often give another crop by throwing out side-shoots which form nice small heads after.

Attend to earthing up succession crops. Look well after Brussels sprouts; upon this will depend your supply throughout the hot dry months of April and May. Well grown strong plants will give you six times as much as stunted ones.

Flower Garden.

Most of this will be young plants, with the exception of chrysanthemum, which will just be past. Remove them from the bedsto some poor nursery soil, which will have the effect of making them throw out numerous offsets wherewith to increase your next season's stock.

The following is a list of very useful annuals, which annually sow themselves, and may be had now from the shrubberie and other places where they were grown last season:—

Ageratum, convolvulus, coreopsis, dianthus, gaillardia œnothera, phlox drummondii, salvia, and savitalia.

JANUARY—*continued.*

Geraniums are best procured from cuttings from a hill station annually and are well worth the trouble, as they last until the first rains kill them. If the cuttings had been procured in October, they will now be fine strong plants, and do well to take the place of the chrysanthemums which have just been cleared away to the nursery.

FEBRUARY.

Sow a small succession of English vegetables to keep up a supply into the hot weather. Lettuce, radish, knol-kohl, and other sorts that complete their growth quickly are suitable.

Re-pot permanent pot plants before the hot weather sets in, keep in partial shade and sprinkle with water several times daily, look carefully to prevent over-watering at the root, as much injury is done by over-watering newly potted plants.

Maiden hair fern will be showing signs of going to rest. Gradually withhold water, as the fronds dry up, and stow away dry in a shady place till the rains come.

Plantains should have the soil near the stem removed, and be liberally dressed with cattle manure and fresh soil.

MARCH.

Asparagus should be flooded twice weekly. Plant watermelon seed. If a river bed is not available for this crop, give a liberal supply of gravel and manure to ordinary soil laid up in ridges for irrigation.

Save seed from cold-weather flowers that are drying off and dig up all empty beds.

APRIL.

Asparagus will be getting fit for use. Avoid heavy cutting at first, as it will greatly weaken the plants.

Plant out arrowroot, sweet potatoes, and yams. Recently potted plants should be sprinkled freely with water overhead, and the ground is to be kept moist so as to maintain a moist atmosphere.

Portulacca will be in full flower; see that it is watered in the evening, and as little overhead as possible.

Inarched mango trees should now be fit to remove, keep in a shady place until the planting season. Inarch beir as soon as the fruit is gathered.

MAY.

Sow country vegetables, such as maize, ochro, brinjals, gourds, cucumbers, beans, &c.

In the flower garden the work is the same as last month.

Fruit trees swelling fruit should be liberally watered. Withhold water from such as are ripening fruit.

Caladiums, achimenes, amaryllis, gesnera, gloxinias, and lilies of kinds will now be showing signs of vitality; have them all put into boxes filled with good river sand, and when they have grown sufficiently to admit of being handled have them potted off into their various soils suited for each.

JUNE.

Look to drainage arrangements to allow surplus water to escape when the monsoon sets in. Make successive sowings of country vegetables mentioned last month; provide stakes for vegetables that are climbers to adhere to.

Khamach and charputtee look well on a neat bamboo trellise, and are worthy of such attention.

Sow annuals under cover immediately after the first fall of rain. Celosia, cockscomb, balsam, ipomœa, marigold, sunflower, and zinnia are among the best at this season. Plant cuttings of deciduous shrubs.

Thin out plantain stems where too crowded and make new plantations.

Manure guava, pomegranate, and papay trees.

JULY.

Sow tomatoes, French beans, and keep up successive sowings of country vegetables. Earth up Jerusalem artichokes, arrowroot, yams, &c., and see they do not get water-logged during heavy rains.

This will be a busy month. If not done in the later end of last month, remove back to the nursery your hot-weather plants, and plant out as soon as they can be handled all young plants seeds of which were sown last month. Make successive sowings to replace failures. Re-pot all bulbous and tuberous-rooted plants that are showing vitality.

Make new plantation of pine-apple by digging a trench one and a half feet deep and the same breadth; fill up with manure and level the ground, plant two feet apart immediately over the trenches. Trenches to be four feet apart.

AUGUST.

Sow celery in pans, asparagus in open ground, and successions of French beans; dig all empty ground, but be careful it is not too wet when this operation is being performed; dig in all vegetation that may be growing on the ground, nothing makes better manure.

Sow asters, sunflower, petunia, and seeds of any trees and shrubs which generally make handsomer plants than cuttings do. Continue putting down cuttings of all kinds of shrubs and trees required.

Bud peaches and oranges and thin out the fruit of guavas and custard apples.

Roses may be successfully budded this month if grafting wax be used and they will form fine thorny plants by January.

SEPTEMBER.

Sow tomatoes, French beans, capsicums, and chillies.

Plant out sunflower and petunias; clear away beds of monsoon plants that are done flowering, and well manure all beds that are empty to be ready for the cold-weather crops; bud roses, and continue doing so until January.

Open out and manure orange trees, plant out in permanent quarters all fruit trees that have been neglected to be planted during the monsoon.

OCTOBER.

Sow cabbage, cauliflower, asparagus, beet, Brussels sprouts, carrot, celery, couve, tronchuda, endive, lettuce, kohl rabi, parsnip, radish, turnips, and all herbs.

Plant out tomato, capsicum, and brinjals. Towards the end of the month plant potato.

Sow all hardy annuals. A list of the few most effective is herewith attached:—Antirrhinum, bellis, candytuft, carduus, crysanthemum, dianthus, Eschscholtzia, heliotrope, larkspur, linum, lupins, mignonette, nasturtium, œnothera, phlox drummondi, and verbena.

Chrysanthemum, perennial, should now be removed to the flower garden. Geraniums are better grown from cuttings obtained from the hill stations than from seed.

Verbena old roots should be replanted in a mixture of leaf mould and well rotted cowdung and kept in slight shade.

Protect guavas, custard apples, and pomegranates from birds and flying foxes; manure oranges, &c., that were neglected last month; see that young mangoes have a plentiful supply of water.

NOVEMBER.

Make successive sowings of all last month's list and sow onions. Those vegetables sown last month will be ready to plant out. Keep a good look-out for all failures, and have them replaced at once.

Sow peas on well prepared ground. This is the most difficult of all English vegetables to grow in Guzerat; sow on well raised ridges four feet apart; the space between can be utilized by planting lettuce or any equally dwarf and quiet-growing crop. Never water peas overhead or let the water flow over the ridges, as immediate failure of your crop will be the result.

Make small successive sowings to fill in failures, or to plant up any bed that has had late monsoon flowers in it; keep the hoe well going, as well stirred ground gives out its moisture more gradually and heats much slower than hard baked ground. As the nights get cool, water everything in the morning early. Put in cuttings of all shrubs and roses that will not strike during the heavy rains.

Remove papays as soon as a little yellow appears at the bottom of the fruit and store away until entirely yellow. This fruit will be in season throughout the cold weather months. Well water all fruit trees forming fruit; those finishing their growth, such as young mangoes, grape vines, &c., should not be watered preparatory to putting them to rest. Sow Cape gooseberries.

DECEMBER.

Keep up successive sowings of radishes, cress, mustard, lettuce, and peas. Plant out all plants as early as they can be handled, as plants long retained in the seed-beds are apt to get stunted.

As asparagus will now be almost gone to rest withhold all water from old plants, and as soon as the seed is ripe cut the stems down and top dress with well rotted cattle manure.

The garden will now be gay with all the hardy annuals of Europe. Caladiums, gesneras, and such tuberous and bulbous-rooted plants will now be dying off; withhold water gradually, and store away in some dry place secure from the ravages of vermin. Make successive sowings of browallia, calliopsis, &c.

GARDENING NOTES FOR TIRHOOT.

By Mr. C. Maries.

JANUARY.

VERY little can now be done with English vegetables. Peas may be sown, but it is doubtful if the crop will be satisfactory. Carrots and beet may be sown for late crops. Celery should be earthed up and abundance of water given. All vegetable crops need abundant irrigation at this season.

Globe artichokes will be improved by a good mulching of cowdung or other manure and free watering. Nearly all the country sorts of pumpkins and melons may now be sown. Ripe pumpkins should be cut and hung up for future use. Maize can be sown now; get the variety called Early Canada if available.

This is the season for pruning peaches and vines; the latter I generally prune back to the last good eye of the growth of the last season. Vines are benefited by untying all the branches and laying them on the ground till growth is commencing. In the meanwhile the lattice work can be renewed or cleaned as may be necessary and the vines trained neatly. In this country peaches grow more vigorously than in England, and the English treatment is unsuitable here. It is advisable not to cut back much and to preserve the small shoots with double or treble buds as those are flower buds. Gross shoots may all be taken out. I generally shorten them to give the tree a regular appearance. If the branches appear too crowded it is easy to thin out.

Strawberry should have clean straw laid between the plants to keep the fruit clean. Manure and earth up asparagus and water freely.

Roses may be grafted by budding at this season on cuttings of Rose Edward, put down during November.

Annuals will now be showing flowers; water freely in the evening. Cuttings of roses and many other flowering shrubs root freely if put in during this season in a shady spot and watered freely.

Few plants should be repotted now, and the less of that sort of work done until the hot winds are over the better.

Orchids should be collected and fastened to blocks or trees. Established orchids should not be watered until flowers begin to show. Chrysanthemums strike root freely at this season.

Verbena may be propagated, and if grown on raised beds will make a show till late in the rainy season. Caladiums and Achimenes should be looked to. If the latter are wanted to bloom early, the pots should be watered, and a day or two later the roots should be shaken out and repotted in a light mixture of sand and leaf-mould.

Bananas should be earthed up and manured. Sugarcane for table use planted and fine cuttings planted in sandy soil in a shady place.

Layering of gardenia, honeysuckle, stephanotis, jessamines, and many other shrubs may be done effectually during this season.

FEBRUARY.

Little can be done with English vegetables during this month [except to eat them, *Ed.*]. I generally sow celery on raised beds in shade to be kept on through the rainy season and planted out during September or October. Water-melons and Persian melons may be sown if last month's sowing is defective. The soil must be extremely rich in manure and water abundant. If grown in the garden pots very heavily manured soil may be arranged to stand in "saucers" or flat pots, which should be kept filled with water. Poudrette is specially suited for such crops, and it may be used freely without danger of overgrowth, such as is produced in fruit trees.

MARCH, APRIL, MAY.

There is very little distinct work to be done in the garden during this season. Gathering leaves to prepare leaf-mould and cleaning and digging empty ground are necessary—the latter operation should be carried on, as far as possible, during moonlight nights, so that the men may not be overtaxed during the hot days.

Sow seed of the *Victoria regia* as early as it is procurable. An ordinary flower-pot filled with rich soil is sufficient for the seed. The pot should be sunk in a tank so that four inches of water may remain above the soil and some kind of a guard arranged to keep out fish; a basket with the bottom cut out firmly pegged down is sufficient. When the plant has leaves as large as the hand fish will not injure it. For details of the necessary arrangements read the article under the heading "VICTORIA."

The conservatory and orchid house need special attention to keep out hot winds and maintain sufficient moisture.

The following notes having been omitted in their respective places are given here :—

FUCHSIA ONAGRACEÆ.

At an altitude of 4,000 feet and upwards this very beautiful shrub grows freely in a loamy soil, enriched with abundant old manure and leaf-mould. The rainy and cold seasons send the plants to rest, therefore early in spring the plants should be pruned of all weakly branches: only a straight stem and a few strong side branches, cut back to a few inches in length, should be left, then re-potted or transplanted into freshly prepared soil. After growth has fairly set in, frequent waterings with weak liquid-manure are desirable.

If the firm, well ripened parts of the prunings are inserted as cuttings with the precautions given under "PROPAGATION" the stock may be increased easily.

BOUSSINGALTIA BASELLOIDES, *Chenopodiaceæ.*

A charming climbing plant, attaining 10 feet in height and having perennial roots and annual stems bearing alternate, fleshy, entire, stalked, cordate leaves without stipules, and producing during June and July very numerous white sweet-scented flowers about $\frac{1}{16}$ inch in expansion, arranged with short stalks in racemes 6 to 8 inches in length.

It thrives well at Poona in a rich loamy soil on a very slightly shaded trellis, and is easily propagated by dividing the root or by small tubers that appear on the stem.

ENDIVE, *Cichorium endivia ; Compositæ.*

This is a wholesome salad and is used by the French also as a boiled vegetable. Its cultivation is the same as that noted for Lettuce. Endive should be blanched by carefully tying the leaves together or covering with an inverted flower pot, over which a basket may be placed to keep it cool, otherwise the plant may rot.

QUASSIA AMARA, THE QUASSIA TREE; *Simarubeæ,*

Is in our gardens a very pretty shrub, difficult to propagate, therefore rare and costly. In the Botanical Gardens at Calcutta it may be seen growing on a rich alluvial soil fully exposed to the sun. The leaves are alternate, unequally pinnate, having about seven long narrow entire pinnæ and crimson-tinged wings on the leaf-stalk. The flowers are in terminal clusters, bright scarlet, tubular, and about 1½ inches in length.

Propagation is most safely effected by layering.

TITHONIA TAGETIFLORA, *Compositæ.*

A large soft-wooded shrub, bearing alternate, divided leaves, and in October very numerous flowers resembling small sunflowers. It is a very showy shrub fit for the outskirts of the garden, and a good rapid growing screen if on a rich soil watered freely. It may be propagated easily by inserting large cuttings during the rainy season. The plant is valuable as a source of honey for bees.

HOLLYHOCK, *Althea rosea.*

The single varieties of this grand herbaceous plant grow freely with ordinary border treatment in the Deccan. If seed is sown from August to November the plant is in flower from December to February. A rich friable soil and abundant liquid manure are desirable for its developement.

PETUNIA VIOLACEA is of compact habit, and bears purplish violet flowers about ¼ inch in expansion.

P. NYCTAGIFLORA has white flowers about 2 inches in expansion and more flacid than the above.

P. INTERMEDIA combines the colours of the above two. The named varieties are hybrids raised from the above-noted three species. In districts with slight rainfall, such as Poona, the Petunia may be raised from seed any time between June and December if special care is taken to protect the young seedlings from heavy rain and from a close moist atmosphere and to give abundant light; but greater success is met with by sowing after the rainy season is over.

The seed is very minute, therefore it should be mixed with fine sand and sown thinly on the surface of a pot of soil that has been thoroughly watered, then covered by a sheet of glass coated with lime-wash to make it semi-transparent. If the seed is good it will germinate in a few days; in the meanwhile the sheet of glass should be raised twice daily to see if germination has begun, because, if allowed to remain close, the seedlings will damp off quickly. When germination is observed the glass should be kept tilted up at one side and gradually removed. Watering at this stage should be done by dipping the pot into water instead of by a watering pot.

The species described above grow "like weeds "self-sown in many gardens in India, and may be sown in open borders in November without special precautions.

PHLOX DRUMMONDI, *Polemoniaceæ*.

A well-known charming annual, flowering particularly well during the first three months of the year if sown in October and November, but in districts with light rainfall it may be sown as early as June and brought into flower in September. It is better to sow where the plants are wanted to flower rather than to transplant. A loose sandy but rich soil having plenty of leaf mould in it and steady watering is desirable.

PHLOX PERENNIAL, *Polemoniaceæ.*

The varieties of perennial Phlox have been produced from *Phlox maculata* and *Phlox paniculata*, but differ from the typical species so much that the original is often doubtful. In districts with an altitude nearly 2,000 feet and light rainfall the perennial Phlox may be grown with a very gratifying amount of success. As the plants get little rest, grand heads of bloom, such as are common in cottage gardens in Scotland, are not to be expected. The most successful grower at Poona keeps his Phlox in pots in a rich friable compost, and gives regular and abundant water and no shade. The result is the plants are in bloom almost throughout the year, but especially from January to June. Propagation is effected by division.

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LIST OF BEE PLANTS,

Or plants which are specially frequented by bees for honey or pollen.

Undoubtedly this list can be greatly extended. It is a new subject of record in India, and many of the facts are due to Dr. T. Cooke, Principal of the College of Science, Poona.

Acacia glauca, rainy season.
Agave Americana, rainy season.
Banana, musa species.
Bombax Malabaricum, beginning of hot season.
Brugmansia arborea, hot season.
Dalbergia melanoxylon, cold season.
Hexacentris mysorense, end of rainy season.
Sunflower helianthus, end of rainy courses.
Legenandrea mollisima, end of rainy season.
Pongamia glabra, hot season.
Orchids, many species.
Poppy, *Papaver somniferum,* cold season.
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